



# SEQUENCE LISTING

<110> DeAngelis, Paul  
Jing, Wei

<120> TARGETED GLYCOSAMINOGLYCAN POLYMERS BY POLYMER GRAFTING AND  
METHODS OF MAKING AND USING SAME

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					Ser
Val	Pro	Glu	Tyr	Asn	Thr
			900	Glu	Asp
				905	Ile
				Trp	Phe
				Gln	Phe
				910	Ala
					Leu
					Leu
Ile	Leu	Glu	Lys	Lys	Thr
	915			Gly	His
				920	Val
				Phe	Asn
				Lys	Thr
				925	Ser
					Thr
					Leu
Thr	Tyr	Met	Pro	Trp	Glu
930				Arg	Lys
				935	Leu
				Gln	Trp
				940	Thr
				Asn	Glu
				Gln	Ile
Gln	Ser	Ala	Lys	Lys	Gly
945				950	Glu
				Asn	Ile
				Pro	Val
				955	Asn
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 <213> *Pasteurella multocida*

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 gatatatgta aaaaaaatat aacacaatca aaaagtaata aaatagaaga agataatatt 180  
 tctggagaaa acaaattttc agtatcaata aaagatctat ataacgaaat aagcaatagt 240  
 gaattagggg ttacaaaaga aagactagga gccccccctc tagtcagtat tataatgact 300  
 tctcataata cagaaaaatt cattgaagcc tcaattaatt cactattatt gcaaacatac 360  
 aataacttag aagttatcgt tgtagatgat tatagcacag ataaaacatt tcagatcgca 420  
 tccagaatag caaactctac aagtaaagta aaaacattcc gattaaactc aaatctaggg 480  
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 gatagcgatg atgtatgtca ccatgaaaga atcgaaagat gtgttaatgc attattatcg 600  
 aataaagata atatagctgt tagatgtgca tattctagaa taaatctaga aacacaaaat 660  
 ataataaaag ttaatgataa taaatacaaa ttaggattaa taactttagg cgtttataga 720  
 aaagtattta atgaaattgg tttttttaac tgcacaacca aagcatcgga tgatgaattt 780  
 tatcatagaa taattaaata ctatggtaaa aataggataa ataacttatt tctaccactg 840  
 tattataaca caatgcgtga agattcatta ttttctgata tggttgagtg ggtagatgaa 900  
 aataatataa agcaaaaaac ctctgatgct agacaaaatt atctccatga attccaaaaa 960  
 atacacaatg aaaggaaatt aatgaatta aaagagattt ttagctttcc tagaattcat 1020  
 gacgccttac ctatatcaa agaatgagt aagctcagca accctaaaat tcctgtttat 1080  
 ataaatatat gctcaatacc ttcaagaata aaacaacttc aatacactat tggagtacta 1140  
 aaaaaccaat gcgatcattt tcatatttat cttgatggat atccagaagt acctgatttt 1200  
 ataaaaaac tagggaataa agcgaccgtt attaattgtc aaaacaaaaa tgagtctatt 1260  
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 aatgatactg ctgtaaatat attaggaact ggaactgttg cttttagagt atctattttt 1560  
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 gaagataaca aaaacactga gaccttattt catgaattcc aaaatagaga tgaaatacaa 1740  
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1851

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<213> Pasteurella multocida

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Glu Ser Leu Val Lys Tyr Asn Ile Asp Ile Cys Lys Lys Asn Ile Thr  
35 40 45

Gln Ser Lys Ser Asn Lys Ile Glu Glu Asp Asn Ile Ser Gly Glu Asn  
50 55 60

Lys Phe Ser Val Ser Ile Lys Asp Leu Tyr Asn Glu Ile Ser Asn Ser  
65 70 75 80

Glu Leu Gly Ile Thr Lys Glu Arg Leu Gly Ala Pro Pro Leu Val Ser  
85 90 95

Ile Ile Met Thr Ser His Asn Thr Glu Lys Phe Ile Glu Ala Ser Ile  
100 105 110

Asn Ser Leu Leu Leu Gln Thr Tyr Asn Leu Glu Val Ile Val Val Asp  
115 120 125

Asp Tyr Ser Thr Asp Lys Thr Phe Gln Ile Ala Ser Arg Ile Ala Asn  
130 135 140

Ser Thr Ser Lys Val Lys Thr Phe Arg Leu Asn Ser Asn Leu Gly Thr  
145 150 155 160

Tyr Phe Ala Lys Asn Thr Gly Ile Leu Lys Ser Lys Gly Asp Ile Ile  
165 170 175

Phe Phe Gln Ser Asp Asp Val Cys His His Glu Arg Ile Glu Arg Cys  
180 185 190

Val Asn Ala Leu Leu Ser Asn Lys Asp Asn Ile Ala Val Arg Cys Ala  
195 200 205

Tyr Ser Arg Ile Asn Leu Glu Thr Gln Asn Ile Ile Lys Val Asn Asp  
Page 14

210	215	220
Asn Lys Tyr Lys Leu Gly 225	Leu Ile Thr Leu Gly 230	Val Tyr Arg Lys Val 235 240
Phe Asn Glu Ile Gly 245	Phe Phe Asn Cys Thr 250	Thr Lys Ala Ser Asp Asp 255
Glu Phe Tyr His Arg Ile Ile Lys Tyr Tyr Gly Lys Asn Arg Ile Asn 260	265	270
Asn Leu Phe Leu Pro Leu Tyr Tyr Asn Thr Met Arg Glu Asp Ser Leu 275	280	285
Phe Ser Asp Met Val Glu Trp Val Asp Glu Asn Asn Ile Lys Gln Lys 290	295	300
Thr Ser Asp Ala Arg Gln Asn Tyr Leu His Glu Phe Gln Lys Ile His 305	310	315 320
Asn Glu Arg Lys Leu Asn Glu Leu Lys Glu Ile Phe Ser Phe Pro Arg 325	330	335
Ile His Asp Ala Leu Pro Ile Ser Lys Glu Met Ser Lys Leu Ser Asn 340	345	350
Pro Lys Ile Pro Val Tyr Ile Asn Ile Cys Ser Ile Pro Ser Arg Ile 355	360	365
Lys Gln Leu Gln Tyr Thr Ile Gly Val Leu Lys Asn Gln Cys Asp His 370	375	380
Phe His Ile Tyr Leu Asp Gly Tyr Pro Glu Val Pro Asp Phe Ile Lys 385	390	395 400
Lys Leu Gly Asn Lys Ala Thr Val Ile Asn Cys Gln Asn Lys Asn Glu 405	410	415
Ser Ile Arg Asp Asn Gly Lys Phe Ile Leu Leu Glu Lys Leu Ile Lys 420	425	430
Glu Asn Lys Asp Gly Tyr Tyr Ile Thr Cys Asp Asp Asp Ile Arg Tyr 435	440	445
Pro Ala Asp Tyr Thr Asn Thr Met Ile Lys Lys Ile Asn Lys Tyr Asn 450	455	460
Asp Lys Ala Ala Ile Gly Leu His Gly Val Ile Phe Pro Ser Arg Val		

465                      470                      475                      480  
 Asn Lys Tyr Phe Ser Ser Asp Arg Ile Val Tyr Asn Phe Gln Lys Pro  
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 Leu Glu Asn Asp Thr Ala Val Asn Ile Leu Gly Thr Gly Thr Val Ala  
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 Phe Arg Val Ser Ile Phe Asn Lys Phe Ser Leu Ser Asp Phe Glu His  
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 Pro Gly Met Val Asp Ile Tyr Phe Ser Ile Leu Cys Lys Lys Asn Asn  
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 Ile Leu Gln Val Cys Ile Ser Arg Pro Ser Asn Trp Leu Thr Glu Asp  
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 Asn Lys Asn Thr Glu Thr Leu Phe His Glu Phe Gln Asn Arg Asp Glu  
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 Ile Gln Ser Lys Leu Ile Ile Ser Asn Asn Pro Trp Gly Tyr Ser Ser  
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 Ile Tyr Pro Leu Leu Asn Asn Asn Ala Asn Tyr Ser Glu Leu Ile Pro  
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 <213> *Pasteurella multocida*

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 <213> Pasteurella multocida

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Pro Gln His Glu Lys Glu Asn Glu Leu Asn Thr Phe Gln Asn Lys Ile  
 20 25 30

Asp Ser Leu Lys Thr Thr Leu Asn Lys Asp Ile Ile Ser Gln Gln Thr  
 Page 17

35					40					45					
Leu	Leu	Ala	Lys	Gln	Asp	Ser	Lys	His	Pro	Leu	Ser	Ala	Ser	Leu	Glu
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Asn	Glu	Asn	Lys	Leu	Leu	Leu	Lys	Gln	Leu	Gln	Leu	Val	Leu	Gln	Glu
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Phe	Glu	Lys	Ile	Tyr	Thr	Tyr	Asn	Gln	Ala	Leu	Glu	Ala	Lys	Leu	Glu
				85					90					95	
Lys	Asp	Lys	Gln	Thr	Thr	Ser	Ile	Thr	Asp	Leu	Tyr	Asn	Glu	Val	Ala
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Lys	Ser	Asp	Leu	Gly	Leu	Val	Lys	Glu	Thr	Asn	Ser	Val	Asn	Pro	Leu
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Val	Ser	Ile	Ile	Met	Thr	Ser	His	Asn	Thr	Ala	Gln	Phe	Ile	Glu	Ala
	130					135					140				
Ser	Ile	Asn	Ser	Leu	Leu	Leu	Gln	Thr	Tyr	Lys	Asn	Ile	Glu	Ile	Ile
145				150						155					160
Ile	Val	Asp	Asp	Asp	Ser	Ser	Asp	Asn	Thr	Phe	Glu	Ile	Ala	Ser	Arg
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Ile	Ala	Asn	Thr	Thr	Ser	Lys	Val	Arg	Val	Phe	Arg	Leu	Asn	Ser	Asn
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Leu	Gly	Thr	Tyr	Phe	Ala	Lys	Asn	Thr	Gly	Ile	Leu	Lys	Ser	Lys	Gly
		195					200					205			
Asp	Ile	Ile	Phe	Phe	Gln	Asp	Ser	Asp	Asp	Val	Cys	His	His	Glu	Arg
	210					215					220				
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Val	Arg	Cys	Ala	Tyr	Ser	Arg	Leu	Ala	Pro	Glu	Thr	Gln	His	Ile	Ile
				245					250					255	
Lys	Val	Asn	Asn	Met	Asp	Tyr	Arg	Leu	Gly	Phe	Ile	Thr	Leu	Gly	Met
			260					265					270		
His	Arg	Lys	Val	Phe	Gln	Glu	Ile	Gly	Phe	Phe	Asn	Cys	Thr	Thr	Lys
		275					280					285			
Gly	Ser	Asp	Asp	Glu	Phe	Phe	His	Arg	Ile	Ala	Lys	Tyr	Tyr	Gly	Lys

290	295	300
Glu Lys Ile Lys Asn Leu Leu Leu Pro Leu Tyr Tyr Asn Thr Met Arg 305 310 315 320		
Glu Asn Ser Leu Phe Thr Asp Met Val Glu Trp Ile Asp Asn His Asn 325 330 335		
Ile Ile Gln Lys Met Ser Asp Thr Arg Gln His Tyr Ala Thr Leu Phe 340 345 350		
Gln Ala Met His Asn Glu Thr Ala Ser His Asp Phe Lys Asn Leu Phe 355 360 365		
Gln Phe Pro Arg Ile Tyr Asp Ala Leu Pro Val Pro Gln Glu Met Ser 370 375 380		
Lys Leu Ser Asn Pro Lys Ile Pro Val Tyr Ile Asn Ile Cys Ser Ile 385 390 395 400		
Pro Ser Arg Ile Ala Gln Leu Arg Arg Ile Ile Gly Ile Leu Lys Asn 405 410 415		
Gln Cys Asp His Phe His Ile Tyr Leu Asp Gly Tyr Val Glu Ile Pro 420 425 430		
Asp Phe Ile Lys Asn Leu Gly Asn Lys Ala Thr Val Val His Cys Lys 435 440 445		
Asp Lys Asp Asn Ser Ile Arg Asp Asn Gly Lys Phe Ile Leu Leu Glu 450 455 460		
Glu Leu Ile Glu Lys Asn Gln Asp Gly Tyr Tyr Ile Thr Cys Asp Asp 465 470 475 480		
Asp Ile Ile Tyr Pro Ser Asp Tyr Ile Asn Thr Met Ile Lys Lys Leu 485 490 495		
Asn Glu Tyr Asp Asp Lys Ala Val Ile Gly Leu His Gly Ile Leu Phe 500 505 510		
Pro Ser Arg Met Thr Lys Tyr Phe Ser Ala Asp Arg Leu Val Tyr Ser 515 520 525		
Phe Tyr Lys Pro Leu Glu Lys Asp Lys Ala Val Asn Val Leu Gly Thr 530 535 540		
Gly Thr Val Ser Phe Arg Val Ser Leu Phe Asn Gln Phe Ser Leu Ser		

545                      550                      555                      560  
 Asp Phe Thr His Ser Gly Met Ala Asp Ile Tyr Phe Ser Leu Leu Cys  
                                  565                                   570                                   575  
 Lys Lys Asn Asn Ile Leu Gln Ile Cys Ile Ser Arg Pro Ala Asn Trp  
                                  580                                   585                                   590  
 Leu Thr Glu Asp Asn Arg Asp Ser Glu Thr Leu Tyr His Gln Tyr Arg  
                                  595                                   600                                   605  
 Asp Asn Asp Glu Gln Gln Thr Gln Leu Ile Met Glu Asn Gly Pro Trp  
                                  610                                   615                                   620  
 Gly Tyr Ser Ser Ile Tyr Pro Leu Val Lys Asn His Pro Lys Phe Thr  
                                  625                                   630                                   635                                   640  
 Asp Leu Ile Pro Cys Leu Pro Phe Tyr Phe Leu  
                                          645                                           650

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 <212> PRT  
 <213> Pasteurella multocida

<400> 9

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                                  20                                   25                                   30  
 Lys Ile Val Glu Phe Gln Ile Thr Lys Cys Lys Glu Lys Leu Ser Ala  
                                  35                                   40                                   45  
 His Pro Ser Val Asn Ser Ala His Leu Ser Val Asn Lys Glu Glu Lys  
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 Val Asn Val Cys Asp Ser Pro Leu Asp Ile Ala Thr Gln Leu Leu Leu  
 65                                   70                                   75                                   80  
 Ser Asn Val Lys Lys Leu Val Leu Ser Asp Ser Glu Lys Asn Thr Leu  
                                  85                                   90                                   95  
 Lys Asn Lys Trp Lys Leu Leu Thr Glu Lys Lys Ser Glu Asn Ala Glu  
                                  100                                   105                                   110  
 Val Arg Ala Val Ala Leu Val Pro Lys Asp Phe Pro Lys Asp Leu Val  
                                  115                                   120                                   125

Leu Ala Pro Leu Pro Asp His Val Asn Asp Phe Thr Trp Tyr Lys Lys  
130 135 140

Arg Lys Lys Arg Leu Gly Ile Lys Pro Glu His Gln His Val Gly Leu  
145 150 155 160

Ser Ile Ile Val Thr Thr Phe Asn Arg Pro Ala Ile Leu Ser Ile Thr  
165 170 175

Leu Ala Cys Leu Val Asn Gln Lys Thr His Tyr Pro Phe Glu Val Ile  
180 185 190

Val Thr Asp Asp Gly Ser Gln Glu Asp Leu Ser Pro Ile Ile Arg Gln  
195 200 205

Tyr Glu Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Asn Gly  
210 215 220

Phe Gln Ala Ser Ala Ala Arg Asn Met Gly Leu Arg Leu Ala Lys Tyr  
225 230 235 240

Asp Phe Ile Gly Leu Leu Asp Cys Asp Met Ala Pro Asn Pro Leu Trp  
245 250 255

Val His Ser Tyr Val Ala Glu Leu Leu Glu Asp Asp Asp Leu Thr Ile  
260 265 270

Ile Gly Pro Arg Lys Tyr Ile Asp Thr Gln His Ile Asp Pro Lys Asp  
275 280 285

Phe Leu Asn Asn Ala Ser Leu Leu Glu Ser Leu Pro Glu Val Lys Thr  
290 295 300

Asn Asn Ser Val Ala Ala Lys Gly Glu Gly Thr Val Ser Leu Asp Trp  
305 310 315 320

Arg Leu Glu Gln Phe Glu Lys Thr Glu Asn Leu Arg Leu Ser Asp Ser  
325 330 335

Pro Phe Arg Phe Phe Ala Ala Gly Asn Val Ala Phe Ala Lys Lys Trp  
340 345 350

Leu Asn Lys Ser Gly Phe Phe Asp Glu Glu Phe Asn His Trp Gly Gly  
355 360 365

Glu Asp Val Glu Phe Gly Tyr Arg Leu Phe Arg Tyr Gly Ser Phe Phe  
370 375 380

Lys Thr Ile Asp Gly Ile Met Ala Tyr His Gln Glu Pro Pro Gly Lys  
385 390 395 400

Glu Asn Glu Thr Asp Arg Glu Ala Gly Lys Asn Ile Thr Leu Asp Ile  
405 410 415

Met Arg Glu Lys Val Pro Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu  
420 425 430

Asp Ser His Ile Asn Arg Val Pro Leu Val Ser Ile Tyr Ile Pro Ala  
435 440 445

Tyr Asn Cys Ala Asn Tyr Ile Gln Arg Cys Val Asp Ser Ala Leu Asn  
450 455 460

Gln Thr Val Val Asp Leu Glu Val Cys Ile Cys Asn Asp Gly Ser Thr  
465 470 475 480

Asp Asn Thr Leu Glu Val Ile Asn Lys Leu Tyr Gly Asn Asn Pro Arg  
485 490 495

Val Arg Ile Met Ser Lys Pro Asn Gly Gly Ile Ala Ser Ala Ser Asn  
500 505 510

Ala Ala Val Ser Phe Ala Lys Gly Tyr Tyr Ile Gly Gln Leu Asp Ser  
515 520 525

Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu Leu Cys Leu Lys Glu Phe  
530 535 540

Leu Lys Asp Lys Thr Leu Ala Cys Val Tyr Thr Thr Asn Arg Asn Val  
545 550 555 560

Asn Pro Asp Gly Ser Leu Ile Ala Asn Gly Tyr Asn Trp Pro Glu Phe  
565 570 575

Ser Arg Glu Lys Leu Thr Thr Ala Met Ile Ala His His Phe Arg Met  
580 585 590

Phe Thr Ile Arg Ala Trp His Leu Thr Asp Gly Phe Asn Glu Lys Ile  
595 600 605

Glu Asn Ala Val Asp Tyr Asp Met Phe Leu Lys Leu Ser Glu Val Gly  
610 615 620

Lys Phe Lys His Leu Asn Lys Ile Cys Tyr Asn Arg Val Leu His Gly  
625 630 635 640

Asp Asn Thr Ser Ile Lys Lys Leu Gly Ile Gln Lys Lys Asn His Phe  
645 650 655

Val Val Val Asn Gln Ser Leu Asn Arg Gln Gly Ile Thr Tyr Tyr Asn  
660 665 670

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<212> DNA  
<213> Pasteurella multocida

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ctcacacg	ctatgattgc	tcaccacttt	agaatgttca	cgattagagc	ttggcattta	1800
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gataacacat	caattaagaa	acttggcatt	caa			1953

<210> 11  
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 <212> DNA  
 <213> *Pasteurella multocida*

<400> 11						
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aatgcaaag	aaaaactctc	agcacatcct	tctgttaatt	cagcacatct	ttctgtaaat	180
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tccaacgtaa	aaaaattagt	actttctgac	tcggaaaaaa	acacgttaaa	aaataaatgg	300
aaattgctca	ctgagaagaa	atctgaaaat	gcggaggtaa	gagcggtcgc	ccttgtacca	360
aaagattttc	caaagatct	ggtttttagcg	cctttacctg	atcatgttaa	tgattttaca	420
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gtaaaccaa	aaacacatta	cccgtttgaa	gttatcgtga	cagatgatgg	tagtcaggaa	600
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gaagtgaaaa	ccaataatag	tgttgccgca	aaaggggaag	gaacagtttc	tctggattgg	960



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agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt	1920
gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat	1980
cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat	2040
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aaagatattt aa	2112

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 <212> DNA  
 <213> *Pasteurella multocida*

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aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat	180
aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt	240
tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg	300
aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc cttgtacca	360
aaagattttc ccaaagatct ggtttttagcg cttttacctg atcatgttaa tgattttaca	420
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tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta	540
gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagataatgg tagtcaggaa	600
gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa	660
aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat	720
gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat	780
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acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca	900
gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg	960
cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt	1020
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tctaaaccaa atggcggaat agcctcagca tcaaattgcag ccgtttcttt tgctaaaggt	1560
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cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat	2040
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aaagatattt aa	2112

<210> 13  
 <211> 1614  
 <212> DNA  
 <213> *Pasteurella multocida*

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aacgatgggt caacagataa taccttagaa gtgatcaata agctttatgg taataatcct	180
agggtacgca tcatgtctaa accaaatggc ggaatagcct cagcatcaaa tgcagccgtt	240
tcttttgcta aaggttatta cattgggcag ttagattcag atgattatct tgagcctgat	300
gcagttgaac tgtgtttaaa agaattttta aaagataaaa cgctagcttg tgtttatacc	360
actaatagaa acgtcaatcc ggatggtagc ttaatcgcta atgggttaca ttggccagaa	420
ttttcacgag aaaaactcac aacggctatg attgctcacc actttagaat gttcacgatt	480
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atgttcctca aactcagtga agttggaaaa tttaaaccatc ttaataaaat ctgctataac	600
cgtgtattac atgggtgataa cacatcaatt aagaaacttg gcattcaaaa gaaaaacat	660
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tttgatgatt tagatgaaag tagaaagtat attttcaata aaaccgctga atatcaagaa	780
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agtatttttt atcccaatac attaaacggc ttagtgaaaa aactaaacaa tattattgaa	900
tataataaaa atatattcgt tattgttcta catgttgata agaatcatct tacaccagat	960
atcaaaaaag aaatactagc cttctatcat aaacatcaag tgaatatattt actaaataat	1020
gatatctcat attacacgag taatagatta ataaaaactg aggcgcattt aagtaatatt	1080
aataaattaa gtcagttaaa tctaaattgt gaatacatca tttttgataa tcatgacagc	1140
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attaaaactt attttaatga caatgactta aaaagtatga atgtgaaagg ggcacacaa	1320
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acatcttgcc agtcaattga tagtgtgcca gaatataaca ctgaggatat ttggttccaa	1440
tttgacattt taatcttaga aaagaaaacc ggccatgtat ttaataaaac atcgaccctg	1500
acttatatgc cttgggaacg aaaattacaa tggacaaatg aacaaattga aagtgcaaaa	1560
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<210> 14  
 <211> 966  
 <212> DNA  
 <213> *Pasteurella multocida*

<400> 14	
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aacgatggtt caacagataa taccttagaa gtgatcaata agctttatgg taataatcct	180
agggtacgca tcatgtctaa accaaatggc ggaatagcct cagcatcaaa tgcagccgtt	240
tcttttgcta aaggttatta cattgggcag ttagattcag atgattatct tgagcctgat	300
gcagttgaac tgtgttttaa agaattttta aaagataaaa cgctagcttg tgtttatacc	360
actaatagaa acgtcaatcc ggatggtagc ttaatcgcta atgggttaca ttggccagaa	420
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cgtgtattac atgggtgata cacatcaatt aagaaacttg gcattcaaaa gaaaaacat	660
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tttgatgatt tagatgaaag tagaaagtat attttcaata aaaccgctga atatcaagaa	780
gagattgata tcttaaaaga tattaaaatc atccagaata aagatgcaa aatcgcagtc	840
agtatTTTTT atcccaatac attaaacggc ttagtgaaaa aactaaacaa tattattgaa	900
tataataaaa atatattcgt tattgttcta catgttgata agaatcatct tacaccagat	960
atctaa	966

<210> 15  
 <211> 1821  
 <212> DNA  
 <213> *Pasteurella multocida*

<400> 15	
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gttatcgtga cagatgatgg tagtcaggaa gatctatcac cgatcattcg ccaatatgaa	180
aataaattgg atattcgcta cgtcagacaa aaagataacg gttttcaagc cagtgccgct	240
cggaatatgg gattacgctt agcaaaatat gactttattg gcttactcga ctgtgatatg	300
gcgccaaatc cattatgggt tcattcttat gttgcagagc tattagaaga tgatgattta	360
acaatcattg gtccaagaaa atacatcgat acacaacata ttgacccaaa agacttctta	420
aataacgcga gtttgcttga atcattacca gaagtgaaaa ccaataatag tgttgccgca	480
aaaggggaag gaacagtttc tctggattgg cgcttagaac aattcgaaaa aacagaaaat	540
ctccgcttat ccgattcgcc tttccgtttt tttgcggcgg gtaatgttgc tttcgctaaa	600
aaatggctaa ataaatccgg tttctttgat gaggaattta atcactgggg tggagaagat	660
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atggcctacc atcaagagcc accaggtaaa gaaaatgaaa ccgatcgtga agcgggaaaa	780
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atagaagatt cgcatatcaa tagagtacct ttagtttcaa tttatatccc agcttataac	900
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gctgaatatc aagaagagat tgatatctta aaagatatta aaatcatcca gaataaagat	1680
gccaaaatcg cagtcagtat tttttatccc aatacattaa acggcttagt gaaaaaacta	1740
aacaatatta ttgaatataa taaaaatata ttcgttattg ttctacatgt tgataagaat	1800
catcttacac cagatatcta a	1821

<210> 16  
 <211> 2112  
 <212> DNA  
 <213> *Pasteurella multocida*

<400> 16	
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aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat	180
aaagaagaaa aagtcaatgt ttgcgtagat ccgtagata ttgcaacaca actgttactt	240
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aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc cttgtacca	360
aaagattttc ccaaagatct ggttttagcg cttttacctg atcatgttaa tgattttaca	420
tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt	480
tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta	540
gtaaaccaa aaacacatta cccgtttgaa gttatcgtga cagatgaagg tagtcaggaa	600
gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa	660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat	720
gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat	780
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agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt	1920
gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat	1980
cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat	2040
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aaagatattt aa	2112

<210> 17  
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 <212> DNA  
 <213> *Pasteurella multocida*

<400> 17	
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aatgcaaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaa	180
aaagaagaaa aagtcaatgt ttgcgatagt ccgtagata ttgcaacaca actgttactt	240

tccaacgtaa	aaaaattagt	actttctgac	tcggaaaaaa	acacgttaaa	aaataaatgg	300
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gaggaattta	atcactgggg	tggagaagat	gtggaatttg	gatatcgctt	attccgttac	1140
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gtcccttata	tctatagaaa	actttttacca	atagaagatt	cgcatatcaa	tagagtacct	1320
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## Lys Glu

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<400> 25

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## Lys Glu Phe

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<210> 28  
 <211> 1902  
 <212> DNA  
 <213> *Pasteurella multocida*

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gcgagggtaa gagcgggtcgc ccttgtagca aaagattttc ccaaagatct gggttttagcg	180
cctttacctg atcatgttaa tgattttaca tggtagaaaa agcgaagaa aagacttggc	240
ataaaacctg aacatcaaca tgttgggtctt tctattatcg ttacaacatt caatcgacca	300
gcaattttat cgattacatt agcctgttta gtaaaccaaa aaacacatta cccgtttgaa	360
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tataattatg	acgaatttga	tgatttagat	gaaagtagaa	agtatatatt	caataaaacc	1860
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<210> 29  
 <211> 1830  
 <212> DNA  
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<210> 30  
 <211> 1764  
 <212> DNA  
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catgttggtc tttctattat cgttacaaca ttcaatcgac cagcaatttt atcgattaca	180
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tacgtcagac aaaaagataa cggttttcaa gccagtgccg ctcggaatat gggattacgc	360
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gttcattctt atgttgacaga gctattagaa gatgatgatt taacaatcat tggccaaga	480
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cctttccggt tttttgcggc gggtaatgtt gctttcgcta aaaaatggct aaataaatcc	720
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gatggttcaa cagataatac cttagaagtg atcaataagc tttatggtaa taatcctagg	1140

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<210> 31  
 <211> 2007  
 <212> DNA  
 <213> *Pasteurella multocida*

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agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt	1920
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<210> 32  
 <211> 2061  
 <212> DNA  
 <213> *Pasteurella multocida*

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<210> 33  
 <211> 2112  
 <212> DNA  
 <213> Pasteurella multocida

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<210> 34  
<211> 2112

<212> DNA  
<213> *Pasteurella multocida*

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tattacattg ggcagttaga atcagatgat tatcttgagc ctgatgcagt tgaactgtgt	1620
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aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa	1740
ctcacaacgg ctatgattgc tcaccacttt agaattgtca cgattagagc ttggcattta	1800
actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatgtt cctcaaactc	1860
agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt	1920
gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat	1980
cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat	2040
gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta	2100
aaagatattt aa	2112

<210> 41  
 <211> 2112  
 <212> DNA  
 <213> *Pasteurella multocida*

<400> 41	
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aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat	180
aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt	240
tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg	300
aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc cttgtacca	360
aaagattttc ccaaagatct ggttttagcg cctttacctg atcatgttaa tgattttaca	420
tggtacaaaa agcgaagaa aagacttggc ataaaacctg aacatcaaca tgttggctct	480
tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta	540
gtaaacaaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa	600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa	660
aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat	720
gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat	780
gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat	840
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tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt	1560
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aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa	1740
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agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatgg	1920
gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat	1980
cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat	2040
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aaagatattt aa	2112

<210> 42  
 <211> 2112  
 <212> DNA  
 <213> *Pasteurella multocida*

<400> 42	
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aaatgcaaag	aaaaactctc	agcacatcct	tctgttaatt	cagcacatct	ttctgtaa	180
aaagaagaaa	aagtcaatgt	ttgcgatagt	ccgttagata	ttgcaacaca	actgttactt	240
tccaacgtaa	aaaaattagt	actttctgac	tcggaaaaaa	acacgttaaa	aaataaatgg	300
aaattgctca	ctgagaagaa	atctgaaaat	gcggaggtaa	gagcggtcgc	ccttgtacca	360
aaagattttc	ccaaagatct	ggtttttagcg	cctttacctg	atcatgttaa	tgattttaca	420
tggtacaaaa	agcgaaagaa	aagacttggc	ataaaacctg	aacatcaaca	tgttggctct	480
tctattatcg	ttacaacatt	caatcgacca	gcaattttat	cgattacatt	agcctgttta	540
gtaaaccaa	aaacacatta	cccgtttgaa	gttatcgtga	cagatgatgg	tagtcaggaa	600
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aaagataacg	gttttcaagc	cagtgccgct	cggaatatgg	gattacgctt	agcaaaatat	720
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gaagtgaaaa	ccaataatag	tgttgccgca	aaaggggaag	gaacagtttc	tctggattgg	960
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tttgcggcgg	gtaatgttgc	tttcgctaaa	aaatggctaa	ataaatccgg	tttctttgat	1080
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tctaaaccaa	atggcggaat	agcctcagca	tcaaatgcag	ccgtttcttt	tgctaaaggt	1560
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gataacacat	caattaagaa	acttggcatt	caaaagaaaa	accattttgt	tgtagtcaat	1980
cagtcattaa	atagacaagg	cataacttat	tataattatg	acgaatttga	tgatttagat	2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta	2100
aaagatatattt aa	2112

<210> 43  
 <211> 2112  
 <212> DNA  
 <213> *Pasteurella multocida*

<400> 43	
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aatgcaaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat	180
aaagaagaaa aagtcaatgt ttgcatagt ccgttagata ttgcaacaca actgttactt	240
tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg	300
aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc cttgtacca	360
aaagattttc ccaagatctt ggttttagcg cttttacctg atcatgttaa tgattttaca	420
tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggctctt	480
tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta	540
gtaaaccaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa	600
gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa	660
aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat	720
gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat	780
gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat	840
acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca	900
gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg	960
cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt	1020
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gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac	1140
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ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat	1380
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tctaaaccaa atggcggaat agcctcagca tcaaagtcag ccgtttcttt tgctaaaggt	1560
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aatccggatg gtagcttaat cgctaattggc tacaattggc cagaattttc acgagaaaaa	1740
ctcacacggt ctatgattgc tcaccacttt agaattgttca cgattagagc ttggcattta	1800
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agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt	1920
gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat	1980
cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat	2040
gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta	2100
aaagatatatt aa	2112

<210> 44  
 <211> 2112  
 <212> DNA  
 <213> *Pasteurella multocida*

<400> 44	
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aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat	180
aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt	240
tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg	300
aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc cttgtacca	360
aaagattttc ccaaagatct ggttttagcg cttttacctg atcatgttaa tgattttaca	420
tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggctct	480
tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta	540
gtaaaccaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa	600
gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa	660
aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat	720
gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat	780
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acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca	900
gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg	960
cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt	1020
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gataatacct	tagaagtgat	caataagctt	tatggtaata	atcctagggg	acgcatcatg	1500
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cagtcattaa	atagacaagg	cataacttat	tataattatg	acgaatttga	tgatttagat	2040
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aaagatatatt	aa					2112

<210> 45  
 <211> 2112  
 <212> DNA  
 <213> *Pasteurella multocida*

<400>	45	
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aatgcaaag	aaaaactctc	agcacatcct tctgttaatt cagcacatct ttctgtaaat 180
aaagaagaaa	aagtcaatgt	ttgcgatagt ccgttagata ttgcaacaca actgttactt 240
tccaacgtaa	aaaaattagt	actttctgac tcggaaaaaa acacgttaaa aaataaatgg 300
aaattgctca	ctgagaagaa	atctgaaaat gcggaggtaa gagcggtcgc cttgtacca 360
aaagattttc	ccaaagatct	ggtttttagcg cttttacctg atcatgttaa tgattttaca 420
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tctattatcg	ttacaacatt	caatcgacca gcaattttat cgattacatt agcctgttta 540
gtaaacaaa	aaacacatta	cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600
gatctatcac	cgatcattcg	ccaatatgaa aataaattgg atattcgcta cgtcagacaa 660
aaagataacg	gttttcaagc	cagtgccgct cggaatatgg gattacgctt agcaaaatat 720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat	780
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gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg	960
cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt	1020
tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat	1080
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aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa	1740
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agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatgg	1920
gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat	1980
cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat	2040
gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta	2100
aaagatattt aa	2112

<210> 46  
 <211> 2112  
 <212> DNA  
 <213> *Pasteurella multocida*

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aaatgcaaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat	180
aaagaagaaa aagtcaatgt ttgcgatagt ccgtagata ttgcaacaca actgttactt	240

tccaacgtaa	aaaaattagt	actttctgac	tcggaaaaaa	acacgttaaa	aaataaatgg	300
aaattgctca	ctgagaagaa	atctgaaaat	gcgagggtaa	gagcggtcgc	ccttgtagca	360
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gtaaaccaa	aaacacatta	cccgtttgaa	gttatcgta	cagatgatgg	tagtcaggaa	600
gatctatcac	cgatcattcg	ccaatatgaa	aataaattgg	atattcgcta	cgtagacaaa	660
aaagataacg	gttttcaagc	cagtgccgct	cggaatatgg	gattacgctt	agcaaaatat	720
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gaaaatgaaa	ccgatcgta	agcgggaaaa	aatattacgc	tcgatattat	gagagaaaag	1260
gtcccttata	tctatagaaa	actttttacca	atagaagatt	cgcatatcaa	tagagtacct	1320
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gataacacat	caattaagaa	acttggcatt	caaaagaaaa	accattttgt	tgtagtcaat	1980
cagtcattaa	atagacaagg	cataacttat	tataattatg	acgaatttga	tgatttagat	2040
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aaagatattt	aa					2112

<210> 47  
 <211> 2112  
 <212> DNA  
 <213> *Pasteurella multocida*

<400> 47  
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 aaagaagaaa aagtcaatgt ttgcatagt ccgttagata ttgcaacaca actgttactt 240  
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 aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc cttgtacca 360  
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 tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta 540  
 gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600  
 gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa 660  
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gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat	1980
cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat	2040
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aaagatattt aa	2112

<210> 48  
 <211> 2112  
 <212> DNA  
 <213> *Pasteurella multocida*

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aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaa	180
aaagaagaaa aagtcaatgt ttgcatagt ccgtagata ttgcaacaca actgttactt	240
tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg	300
aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc cttgtacca	360
aaagattttc ccaagatct ggtttttagcg cttttacctg atcatgttaa tgattttaca	420
tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggctct	480
tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta	540
gtaaaccaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa	600
gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa	660
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cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat	2040
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aaagatattt aa	2112

<210> 49  
 <211> 2112  
 <212> DNA  
 <213> Pasteurella multocida

<400> 49	
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aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat	180
aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt	240
tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg	300
aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc cttgtacca	360
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tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta	540
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gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa	660
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gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg	960
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gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat	1980
cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat	2040
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aaagatattt aa	2112

<210> 50  
 <211> 2112  
 <212> DNA  
 <213> *Pasteurella multocida*

<400> 50	
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aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt	240
tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg	300
aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca	360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca	420
tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtcctt	480
tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta	540
gtaaacaaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa	600
gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa	660
aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat	720
gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat	780
gttgagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat	840
acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca	900
gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg	960
cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt	1020
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tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt	1560
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cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat	2040
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aaagatatatt aa	2112

<210> 51  
 <211> 2136  
 <212> DNA

<213> *Pasteurella multocida*

<400> 51

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<210> 52  
 <211> 2091  
 <212> DNA  
 <213> *Pasteurella multocida*

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 gctaattggtt acaattggcc agaattttca cgagaaaaac tcacaacggc tatgattgct 1740  
 caccacttta gaatgttcac gattagagct tggcatttaa ctgatggatt caatgaaaaa 1800  
 attgaaaatg ccgtagacta tgacatgttc ctcaaactca gtgaagttgg aaaattttaa 1860  
 catcttaata aaatctgcta taaccgtgta ttacatgggtg ataacacatc aattaagaaa 1920  
 cttggcattc aaaagaaaaa ccattttgtt gtagtcaatc agtcattaaa tagacaaggc 1980  
 ataacttatt ataattatga cgaatttgat gatttagatg aaagtagaaa gtatattttc 2040  
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33

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43

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33

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<223> A, G, C or T

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39

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<213> Pasteurella multocida

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Lys Asp Ala Leu Thr Leu Tyr Glu Asn Ile Ala Lys Ile Tyr Gly Ser  
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Glu Ser Leu Val Lys Tyr Asn Ile Asp Ile Cys Lys Lys Asn Ile Thr  
 35 40 45  
 Gln Ser Lys Ser Asn Lys Ile Glu Glu Asp Asn Ile Ser Gly Glu Asn  
 50 55 60  
 Glu Phe Ser Val Ser Ile Lys Asp Leu Tyr Asn Glu Ile Ser Asn Ser  
 65 70 75 80  
 Glu Leu Gly Ile Thr Lys Glu Arg Leu Gly Ala Pro Pro Leu Val Ser  
 85 90 95  
 Ile Ile Met Thr Ser His Asn Thr Glu Lys Phe Ile Glu Ala Ser Ile  
 100 105 110  
 Asn Ser Leu Leu Leu Gln Thr Tyr Asn Asn Leu Glu Val Ile Val Val  
 115 120 125  
 Asp Asp Tyr Ser Thr Asp Lys Thr Phe Gln Ile Ala Ser Arg Ile Ala  
 130 135 140  
 Asn Ser Thr Ser Lys Val Lys Thr Phe Arg Leu Asn Ser Asn Leu Gly  
 145 150 155 160  
 Thr Tyr Phe Ala Lys Asn Thr Gly Ile Leu Lys Ser Lys Gly Asp Ile  
 165 170 175  
 Ile Phe Phe Gln Asp Ser Asp Asp Val Cys His His Glu Arg Ile Glu  
 180 185 190  
 Arg Cys Val Asn Ala Leu Leu Ser Asn Lys Asp Asn Ile Ala Val Arg  
 195 200 205  
 Cys Ala Tyr Ser Arg Ile Asn Leu Glu Thr Gln Asn Ile Ile Lys Val  
 210 215 220  
 Asn Asp Asn Lys Tyr Lys Leu Gly Leu Ile Thr Leu Gly Val Tyr Arg  
 225 230 235 240  
 Lys Val Phe Asn Glu Ile Gly Phe Phe Asn Cys Thr Thr Lys Ala Ser  
 245 250 255  
 Asp Asp Glu Phe Tyr His Arg Ile Ile Lys Tyr Tyr Gly Lys Asn Arg  
 260 265 270  
 Ile Asn Asn Leu Phe Leu Pro Leu Tyr Tyr Asn Thr Met Arg Glu Asp  
 275 280 285

Ser Leu Phe Ser Asp Met Val Glu Trp Val Asp Glu Asn Asn Ile Lys  
290 295 300

Gln Lys Thr Ser Asp Ala Arg Gln Asn Tyr Leu His Glu Phe Gln Lys  
305 310 315 320

Ile His Asn Glu Arg Lys Phe Asn Glu Leu Lys Glu Ile Phe Ser Phe  
325 330 335

Pro Arg Ile His Asp Ala Leu Pro Ile Ser Lys Glu Met Ser Lys Leu  
340 345 350

Ser Asn Pro Lys Ile Pro Val Tyr Ile Asn Ile Cys Ser Ile Pro Ser  
355 360 365

Arg Ile Lys Gln Leu Gln Tyr Thr Ile Gly Val Leu Lys Asn Gln Cys  
370 375 380

Asp His Phe His Ile Tyr Leu Asp Gly Tyr Pro Glu Val Pro Asp Phe  
385 390 395 400

Ile Lys Lys Leu Gly Asn Lys Ala Thr Val Ile Asn Cys Gln Asn Lys  
405 410 415

Asn Glu Ser Ile Arg Asp Asn Gly Lys Phe Ile Leu Leu Glu Lys Leu  
420 425 430

Ile Lys Glu Asn Lys Asp Gly Tyr Tyr Ile Thr Cys Asp Asp Asp Ile  
435 440 445

Arg Tyr Pro Ala Asp Tyr Ile Asn Thr Met Ile Lys Lys Ile Asn Lys  
450 455 460

Tyr Asn Asp Lys Ala Ala Ile Gly Leu His Gly Val Ile Phe Pro Ser  
465 470 475 480

Arg Val Asn Lys Tyr Phe Ser Ser Asp Arg Ile Val Tyr Asn Phe Gln  
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Lys Thr Phe Arg Lys  
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tgatatatgt aaaaaaata taacacaatc aaaaagtaat aaaatagaag aagataatat	180
ttctggagaa aacgaatttt cagtatcaat aaaagatcta tataacgaaa taagcaatag	240
tgaattaggg attacaaaag aaagactagg agccccccct ctagtcagta ttataatgac	300
ttctcataat acagaaaaat tcattgaagc ctcaattaat tcactattat tgcaaacata	360
caataactta gaagttatcg ttgtagatga ttatagcaca gataaaacat ttcagatcgc	420
atccagaata gcaaactcta caagtaaagt aaaaacattc cgattaaact caaatctagg	480
gacatacttt gcgaaaaata caggaatttt aaagtctaaa ggagatatta ttttctttca	540
ggatagcgat gatgtatgtc accatgaaag aatcgaaaga tgtgttaatg cattattatc	600
gaataaagat aatatagctg ttagatgtgc atattctaga ataaatctag aaacacaaaa	660
tataataaaa gttaatgata ataaatacaa attaggatta ataactttag gcgtttatag	720
aaaagtattt aatgaaattg gtttttttaa ctgcacaacc aaagcatcgg atgatgaatt	780
ttatcataga ataattaaat actatggtaa aaataggata aataacttat ttctaccact	840
gtattataac acaatgcgtg aagattcatt attttctgat atggttgagt gggtagatga	900
aaataatata aagcaaaaaa cctctgatgc tagacaaaat tatctccatg aattccaaaa	960
aatacacaat gaaaggaaat ttaatgaatt aaaagagatt tttagctttc ctagaattca	1020
tgacgcctta cctatatcaa aagaaatgag taagctcagc aaccctaaaa ttcctgttta	1080
tataaatata tgctcaatac cttcaagaat aaaacaactt caatacacta ttggagtact	1140
aaaaaaccaa tgcgatcatt ttcatattta tcttgatgga tatccagaag tacctgattt	1200
tataaaaaaa ctagggaata aagcgaccgt tattaattgt caaaacaaaa atgagtctat	1260
tagagataat ggaaagttta ttctattaga aaaacttata aaggaaaata aagatggata	1320
ttatataact tgtgatgatg atatccggtg tcctgctgac tacataaaca ctatgataaa	1380
aaaaattaat aaatacaatg ataaagcagc aattggatta catggtgtta tattcccaag	1440
tagagtcaac aagtatTTTT catcagacag aattgtctat aattttcaaa aaacctttag	1500
aaatgatac	1510

<210> 63  
 <211> 238  
 <212> PRT  
 <213> Escherichia coli

<400> 63

Met	Ile	Val	Ala	Asn	Met	Ser	Ser	Tyr	Pro	Pro	Arg	Lys	Lys	Glu	Leu
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Val His Ser Ile Gln Ser Leu His Ala Gln Val Asp Lys Ile Asn Leu  
20 25 30

Cys Leu Asn Glu Phe Glu Glu Ile Pro Glu Glu Leu Asp Gly Phe Ser  
35 40 45

Lys Leu Asn Pro Val Ile Pro Asp Lys Asp Tyr Lys Asp Val Gly Lys  
50 55 60

Phe Ile Phe Pro Cys Ala Lys Asn Asp Met Ile Val Leu Thr Asp Asp  
65 70 75 80

Asp Ile Ile Tyr Pro Pro Asp Tyr Val Glu Lys Met Leu Asn Phe Tyr  
85 90 95

Asn Ser Phe Ala Ile Phe Asn Cys Ile Val Gly Ile His Gly Cys Ile  
100 105 110

Tyr Ile Asp Ala Phe Asp Gly Asp Gln Ser Lys Arg Lys Val Phe Ser  
115 120 125

Phe Thr Gln Gly Leu Leu Arg Pro Arg Val Val Asn Gln Leu Gly Thr  
130 135 140

Gly Thr Val Phe Leu Lys Ala Asp Gln Leu Pro Ser Leu Lys Tyr Met  
145 150 155 160

Asp Gly Ser Gln Arg Phe Val Asp Val Arg Phe Ser Arg Tyr Met Leu  
165 170 175

Glu Asn Glu Ile Gly Met Ile Cys Val Pro Arg Glu Lys Asn Trp Leu  
180 185 190

Arg Glu Val Ser Ser Gly Ser Met Glu Gly Leu Trp Asn Thr Phe Thr  
195 200 205

Lys Lys Trp Pro Leu Asp Ile Ile Lys Glu Thr Gln Ala Ile Ala Gly  
210 215 220

Tyr Ser Lys Leu Asn Leu Glu Leu Val Tyr Asn Val Glu Gly  
225 230 235

<210> 64  
<211> 520  
<212> PRT  
<213> Escherichia coli

<400> 64

Met Asn Ala Glu Tyr Ile Asn Leu Val Glu Arg Lys Lys Lys Leu Gly  
Page 76

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Thr Asn Ile	Gly Ala Leu Asp Phe	Leu Leu Ser Ile His	Lys Glu Lys
	20	25	30
Val Asp	Leu Gln His Lys Asn	Ser Pro Leu Lys Gly	Asn Asp Asn Leu
	35	40	45
Ile His	Lys Arg Ile Asn	Glu Tyr Asp Asn Val	Leu Glu Leu Ser Lys
	50	55	60
Asn Val	Ser Ala Gln Asn Ser	Gly Asn Glu Phe Ser Tyr	Leu Leu Gly
	65	70	75
Tyr Ala Asp	Ser Leu Arg Lys Val	Gly Met Leu Asp Thr Tyr	Ile Lys
	85	90	95
Ile Val Cys	Tyr Leu Thr Ile Gln	Ser Arg Tyr Phe Lys	Asn Gly Glu
	100	105	110
Arg Val	Lys Leu Phe Glu His	Ile Ser Asn Ala Leu	Arg Tyr Ser Arg
	115	120	125
Ser Asp	Phe Leu Ile Asn	Leu Ile Phe Glu Arg Tyr	Ile Glu Tyr Ile
	130	135	140
Asn His	Leu Lys Leu Ser	Pro Lys Gln Lys Asp	Phe Tyr Phe Cys Thr
	145	150	155
Lys Phe Ser	Lys Phe His Asp Tyr Thr	Lys Asn Gly Tyr Lys	Tyr Leu
	165	170	175
Ala Phe Asp	Asn Gln Ala Asp Ala	Gly Tyr Gly Leu Thr	Leu Leu Leu
	180	185	190
Asn Ala	Asn Asp Asp Met Gln	Asp Ser Tyr Asn Leu	Leu Pro Glu Gln
	195	200	205
Glu Leu Phe	Ile Cys Asn Ala Val	Ile Asp Asn Met	Asn Ile Tyr Arg
	210	215	220
Ser Gln Phe	Asn Lys Cys Leu Arg Lys Tyr	Asp Leu Ser Glu Ile Thr	
	225	230	235
Asp Ile Tyr	Pro Asn Lys Ile Ile Leu	Gln Gly Ile Lys Phe	Asp Lys
	245	250	255
Lys Lys Asn Val	Tyr Gly Lys Asp Leu Val	Ser Ile Ile Met Ser Val	

260	265	270
Phe Asn Ser Glu Asp Thr Ile Ala Tyr Ser Leu His Ser Leu Leu Asn		
275	280	285
Gln Thr Tyr Glu Asn Ile Glu Ile Leu Val Cys Asp Asp Cys Ser Ser		
290	295	300
Asp Lys Ser Leu Glu Ile Ile Lys Ser Ile Ala Tyr Ser Ser Ser Arg		
305	310	315
Val Lys Val Tyr Ser Ser Arg Lys Asn Gln Gly Pro Tyr Asn Ile Arg		
325	330	335
Asn Glu Leu Ile Lys Lys Ala His Gly Asn Phe Ile Thr Phe Gln Asp		
340	345	350
Ala Asp Asp Leu Ser His Pro Glu Arg Ile Gln Arg Gln Val Glu Val		
355	360	365
Leu Arg Asn Asn Lys Ala Val Ile Cys Met Ala Asn Trp Ile Arg Val		
370	375	380
Ala Ser Asn Gly Lys Ile Gln Phe Phe Tyr Asp Asp Lys Ala Thr Arg		
385	390	395
Met Ser Val Val Ser Ser Met Ile Lys Lys Asp Ile Phe Ala Thr Val		
405	410	415
Gly Gly Tyr Arg Gln Ser Leu Ile Gly Ala Asp Thr Glu Phe Tyr Glu		
420	425	430
Thr Val Ile Met Arg Tyr Gly Arg Glu Ser Ile Val Arg Leu Leu Gln		
435	440	445
Pro Leu Ile Leu Gly Leu Trp Gly Asp Ser Gly Leu Thr Arg Asn Lys		
450	455	460
Gly Thr Glu Ala Leu Pro Asp Gly Tyr Ile Ser Gln Ser Arg Arg Glu		
465	470	475
Tyr Ser Asp Ile Ala Ala Arg Gln Arg Val Leu Gly Lys Ser Ile Val		
485	490	495
Ser Asp Lys Asp Val Arg Gly Leu Leu Ser Arg Tyr Gly Leu Phe Lys		
500	505	510
Asp Val Ser Gly Ile Ile Glu Gln		

515

520

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 <213> Mus musculus

<400> 65

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Leu Ala Leu Leu Phe Tyr Phe Gly Gly Val Gln Phe Arg Ala Ser Arg  
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Ser His Ser Arg Arg Glu Glu His Ser Gly Arg Asn Gly Leu His Gln  
 35 40 45

Pro Ser Pro Asp His Phe Trp Pro Arg Phe Pro Asp Ala Leu Arg Pro  
 50 55 60

Phe Phe Pro Trp Asp Gln Leu Glu Asn Glu Asp Ser Ser Val His Ile  
 65 70 75 80

Ser Pro Arg Gln Lys Arg Asp Ala Asn Ser Ser Ile Tyr Lys Gly Lys  
 85 90 95

Lys Cys Arg Met Glu Ser Cys Phe Asp Phe Thr Leu Cys Lys Lys Asn  
 100 105 110

Gly Phe Lys Val Tyr Val Tyr Pro Gln Gln Lys Gly Glu Lys Ile Ala  
 115 120 125

Glu Ser Tyr Gln Asn Ile Leu Ala Ala Ile Glu Gly Ser Arg Phe Tyr  
 130 135 140

Thr Ser Asp Pro Ser Gln Ala Cys Leu Phe Val Leu Ser Leu Asp Thr  
 145 150 155 160

Leu Asp Arg Asp Gln Leu Ser Pro Gln Tyr Val His Asn Leu Arg Ser  
 165 170 175

Lys Val Gln Ser Leu His Leu Trp Asn Asn Gly Arg Asn His Leu Ile  
 180 185 190

Phe Asn Leu Tyr Ser Gly Thr Trp Pro Asp Tyr Thr Glu Asp Val Gly  
 195 200 205

Phe Asp Ile Gly Gln Ala Met Leu Ala Lys Ala Ser Ile Ser Thr Glu  
 210 215 220

Asn Phe Arg Pro Asn Phe Asp Val Ser Ile Pro Leu Phe Ser Lys Asp  
225 230 235 240

His Pro Arg Thr Gly Gly Glu Arg Gly Phe Leu Lys Phe Asn Thr Ile  
245 250 255

Pro Pro Leu Arg Lys Tyr Met Leu Val Phe Lys Gly Lys Arg Tyr Leu  
260 265 270

Thr Gly Ile Gly Ser Asp Thr Arg Asn Ala Leu Tyr His Val His Asn  
275 280 285

Gly Glu Asp Val Leu Leu Leu Thr Thr Cys Lys His Gly Lys Asp Trp  
290 295 300

Gln Lys His Lys Asp Ser Arg Cys Asp Arg Asp Asn Thr Glu Tyr Glu  
305 310 315 320

Lys Tyr Asp Tyr Arg Glu Met Leu His Asn Ala Thr Phe Cys Leu Val  
325 330 335

Pro Arg Gly Arg Arg Leu Gly Ser Phe Arg Phe Leu Glu Ala Leu Gln  
340 345 350

Ala Ala Cys Val Pro Val Met Leu Ser Asn Gly Trp Glu Leu Pro Phe  
355 360 365

Ser Glu Val Ile Asn Trp Asn Gln Ala Ala Val Ile Gly Asp Glu Arg  
370 375 380

Leu Leu Leu Gln Ile Pro Ser Thr Ile Arg Ser Ile His Gln Asp Lys  
385 390 395 400

Ile Leu Ala Leu Arg Gln Gln Thr Gln Phe Leu Trp Glu Ala Tyr Phe  
405 410 415

Ser Ser Val Glu Lys Ile Val Leu Thr Thr Leu Glu Ile Ile Gln Asp  
420 425 430

Arg Ile Phe Lys His Ile Ser Arg Asn Ser Leu Ile Trp Asn Lys His  
435 440 445

Pro Gly Gly Leu Phe Val Leu Pro Gln Tyr Ser Ser Tyr Leu Gly Asp  
450 455 460

Phe Pro Tyr Tyr Tyr Ala Asn Leu Gly Leu Lys Pro Pro Ser Lys Phe  
465 470 475 480



Thr Ala Val Ile His Ala Val Thr Pro Leu Val Ser Gln Ser Gln Pro  
485 490 495

Val Leu Lys Leu Leu Val Ala Ala Ala Lys Ser Gln Tyr Cys Ala Gln  
500 505 510

Ile Ile Val Leu Trp Asn Cys Asp Lys Pro Leu Pro Ala Lys His Arg  
515 520 525

Trp Pro Ala Thr Ala Val Pro Val Ile Val Ile Glu Gly Glu Ser Lys  
530 535 540

Val Met Ser Ser Arg Phe Leu Pro Tyr Asp Asn Ile Ile Thr Asp Ala  
545 550 555 560

Val Leu Ser Leu Asp Glu Asp Thr Val Leu Ser Thr Thr Glu Val Asp  
565 570 575

Phe Ala Phe Thr Val Trp Gln Ser Phe Pro Glu Arg Ile Val Gly Tyr  
580 585 590

Pro Ala Arg Ser His Phe Trp Asp Asn Ser Lys Glu Arg Trp Gly Tyr  
595 600 605

Thr Ser Lys Trp Thr Asn Asp Tyr Ser Met Val Leu Thr Gly Ala Ala  
610 615 620

Ile Tyr His Lys Tyr Tyr His Tyr Leu Tyr Ser His Tyr Leu Pro Ala  
625 630 635 640

Ser Leu Lys Asn Met Val Asp Gln Leu Ala Asn Cys Glu Asp Ile Leu  
645 650 655

Met Asn Phe Leu Val Ser Ala Val Thr Lys Leu Pro Pro Ile Lys Val  
660 665 670

Thr Gln Lys Lys Gln Tyr Lys Glu Thr Met Met Gly Gln Thr Ser Arg  
675 680 685

Ala Ser Arg Trp Ala Asp Pro Asp His Phe Ala Gln Arg Gln Ser Cys  
690 695 700

Met Asn Thr Phe Ala Ser Trp Phe Gly Tyr Met Pro Leu Ile His Ser  
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Gln Met Arg Leu Asp Pro Val Leu Phe Lys Asp Gln Val Ser Ile Leu  
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740 745

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35 40 45

Ser Ile Glu Ser Ser Ser Asp Gly Gly Val Glu Lys Arg Ser Ile Arg  
50 55 60

Glu Val Pro Val Val Arg Leu Pro Thr Asp Ser Pro Ile Pro Glu Arg  
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Gly Asp Leu Ser Cys Arg Met His Thr Cys Phe Asp Val Tyr Arg Cys  
85 90 95

Gly Phe Asn Pro Lys Asn Lys Ile Lys Val Tyr Ile Tyr Pro Leu Lys  
100 105 110

Lys Tyr Val Asp Asp Ala Gly Val Pro Val Ser Ser Ala Ile Ser Arg  
115 120 125

Glu Tyr Asn Glu Leu Leu Thr Ala Ile Ser Asp Ser Asp Tyr Tyr Thr  
130 135 140

Asp Asp Ile Asn Arg Ala Cys Leu Phe Val Pro Ser Ile Asp Val Leu  
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Asn Gln Asn Pro Leu Arg Ile Lys Glu Thr Ala Gln Ala Leu Ala Gln  
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Leu Ser Arg Trp Asp Arg Gly Thr Asn His Leu Leu Phe Asn Met Leu  
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Pro Gly Ala Pro Pro Asp Tyr Asn Thr Ala Leu Asp Val Pro Arg Asp  
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Arg Ala Leu Leu Ala Gly Gly Gly Phe Ser Thr Trp Thr Tyr Arg Gln  
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 Gly Tyr Asp Val Ser Ile Pro Val Phe Ser Pro Leu Ser Ala Glu Met  
 225 230 235 240  
 Ala Leu Pro Glu Lys Ala Pro Gly Pro Arg Arg Tyr Phe Leu Leu Ser  
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 Ser Gln Met Ala Ile His Pro Glu Tyr Arg Glu Glu Leu Glu Ala Leu  
 260 265 270  
 Gln Ala Lys His Gln Glu Ser Val Leu Val Leu Asp Lys Cys Thr Asn  
 275 280 285  
 Leu Ser Glu Gly Val Leu Ser Val Arg Lys Arg Cys His Gln His Gln  
 290 295 300  
 Val Phe Asp Tyr Pro Gln Val Leu Gln Glu Ala Thr Phe Cys Thr Val  
 305 310 315 320  
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 Ala Gly Cys Val Pro Val Val Ile Ala Asp Ser Tyr Ile Leu Pro Phe  
 340 345 350  
 Ser Glu Val Leu Asp Trp Lys Lys Ala Ser Val Val Val Pro Glu Glu  
 355 360 365  
 Lys Met Ser Asp Val Tyr Ser Ile Leu Gln Asn Ile Pro Gln Arg Gln  
 370 375 380  
 Ile Glu Glu Met Gln Arg Gln Ala Arg Trp Phe Trp Glu Ala Tyr Phe  
 385 390 395 400  
 Gln Ser Ile Lys Ala Ile Ala Leu Ala Thr Leu Gln Ile Ile Asn Asp  
 405 410 415  
 Arg Ile Tyr Pro Tyr Ala Ala Ile Ser Tyr Glu Glu Trp Asn Asp Pro  
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 Pro Ala Val Lys Trp Ala Ser Val Ser Asn Pro Leu Phe Leu Pro Leu  
 435 440 445  
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Arg Val Glu Ser Leu Phe Arg Val Ile Thr Glu Val Ser Lys Val Pro  
 465 470 475 480  
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 485 490 495  
 Pro Glu Glu Ser Leu Trp Pro Lys Ile Arg Val Pro Leu Lys Val Val  
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 Arg Thr Ala Glu Asn Lys Leu Ser Asn Arg Phe Phe Pro Tyr Asp Glu  
 515 520 525  
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 Thr Ser Asp Glu Leu Gln Phe Gly Tyr Glu Val Trp Arg Glu Phe Pro  
 545 550 555 560  
 Asp Arg Leu Val Gly Tyr Pro Gly Arg Leu His Leu Trp Asp His Glu  
 565 570 575  
 Met Asn Lys Trp Lys Tyr Glu Ser Glu Trp Thr Asn Glu Val Ser Met  
 580 585 590  
 Val Leu Thr Gly Ala Ala Phe Tyr His Lys Tyr Phe Asn Tyr Leu Tyr  
 595 600 605  
 Thr Tyr Lys Met Pro Gly Asp Ile Lys Asn Trp Val Asp Ala His Met  
 610 615 620  
 Asn Cys Glu Asp Ile Ala Met Asn Phe Leu Val Ala Asn Val Thr Gly  
 625 630 635 640  
 Lys Ala Val Ile Lys Val Thr Pro Arg Lys Lys Phe Lys Cys Pro Glu  
 645 650 655  
 Cys Thr Ala Ile Asp Gly Leu Ser Leu Asp Gln Thr His Met Val Glu  
 660 665 670  
 Arg Ser Glu Cys Ile Asn Lys Phe Ala Ser Val Phe Gly Thr Met Pro  
 675 680 685  
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 <223> any amino acid

<220>  
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 <222> (46)..(61)  
 <223> any amino acid

<220>  
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 <222> (65)..(65)  
 <223> any amino acid

<220>  
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 <222> (68)..(68)  
 <223> any amino acid

<220>  
 <221> MISC\_FEATURE  
 <222> (69)..(69)  
 <223> Cys or Ser

<220>  
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 <222> (71)..(71)  
 <223> His or Pro

<220>  
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 <222> (75)..(75)  
 <223> any amino acid

<400> 67

Gln Thr Tyr Xaa Asn Xaa Glu Xaa Xaa Xaa Xaa Asp Asp Xaa Xaa Xaa  
 1 5 10 15

Asp Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Ile Ala Xaa Xaa Xaa Xaa Xaa  
 20 25 30

Val Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Gly Xaa Tyr Xaa Xaa Xaa  
35 40 45

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Phe Gln Asp  
50 55 60

Xaa Asp Asp Xaa Xaa His Xaa Glu Arg Ile Xaa Arg  
65 70 75

<210> 68  
<211> 102  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> motif

<220>  
<221> MISC\_FEATURE  
<222> (1)..(1)  
<223> Lys or Arg

<220>  
<221> MISC\_FEATURE  
<222> (3)..(3)  
<223> any amino acid

<220>  
<221> MISC\_FEATURE  
<222> (8)..(19)  
<223> each position may be any amino acid

<220>  
<221> MISC\_FEATURE  
<222> (20)..(24)  
<223> may be missing from sequence; each position may be any amino acid

<220>  
<221> MISC\_FEATURE  
<222> (20)..(24)  
<223> all or part of sequence comprising residues 20-24 may be missing;  
each position may be any amino acid

<220>  
<221> MISC\_FEATURE  
<222> (29)..(29)  
<223> Arg or Ile

<220>  
<221> MISC\_FEATURE  
<222> (32)..(32)  
<223> any amino acid

<220>  
<221> MISC\_FEATURE  
<222> (35)..(37)  
<223> any amino acid

<220>  
 <221> MISC\_FEATURE  
 <222> (39)..(84)  
 <223> each position may be any amino acid  
  
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 <221> MISC\_FEATURE  
 <222> (85)..(94)  
 <223> all or part of sequence comprising residues 85-94 may be missing;  
 each position may be any amino acid  
  
 <220>  
 <221> MISC\_FEATURE  
 <222> (96)..(96)  
 <223> any amino acid

<400> 68

Xaa Asp Xaa Gly Lys Phe Ile Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asp Asp Asp Ile Xaa Tyr Pro Xaa  
 20 25 30

Asp Tyr Xaa Xaa Xaa Met Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 35 40 45

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 50 55 60

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 65 70 75 80

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Val Asn Xaa  
 85 90 95

Leu Gly Thr Gly Thr Val  
 100

<210> 69  
 <211> 1854  
 <212> DNA  
 <213> Pasteurella multocida

<400> 69  
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 gatatatgta aaaaaaatat aacacaatca aaaagtaata aaatagaaga agataatatt 180  
 tctggagaaa acaaattttc agtatcaata aaagatctat ataacgaaat aagcaatagt 240  
 gaattagggg ttacaaaaga aagactagga gccccccctc tagtcagtat tataatgact 300  
 tctcataata cagaaaaatt cattgaagcc tcaattaatt cactattatt gcaaacatac 360



aataacttag aagttatcgt tgtagatgat tatagcacag ataaaacatt tcagatcgca 420  
tccagaatag caaactctac aagtaaagta aaacattcc gattaaactc aaatctaggg 480  
acatactttg cgaaaaatac aggaatttta aagtctaaag gagatattat tttctttcag 540  
gatagcgatg atgtatgtca ccatgaaaga atcgaaagat gtgttaatgc attattatcg 600  
aataaagata atatagctgt tagatgtgca tattctagaa taaatctaga aacacaaaat 660  
ataataaaag ttaatgataa taaatacaaa ttaggattaa taactttagg cgtttataga 720  
aaagtattta atgaaattgg tttttttaac tgcacaacca aagcatcgga tgatgaattt 780  
tatcatagaa taattaaata ctatggtaaa aataggataa ataacttatt tctaccactg 840  
tattataaca caatgcgtga agattcatta ttttctgata tggttgagtg ggtagatgaa 900  
aataatataa agcaaaaaac ctctgatgct agacaaaatt atctccatga attccaaaaa 960  
atacacaatg aaaggaaatt aaatgaatta aaagagattt ttagctttcc tagaattcat 1020  
gacgccttac ctatatcaaa agaaatgagt aagctcagca accctaaaat tcctgtttat 1080  
ataaatatat gctcaatacc ttcaagaata aaacaacttc aatacactat tggagtacta 1140  
aaaaaccaat gcgatcattt tcatatttat cttgatggat atccagaagt acctgatttt 1200  
ataaaaaaac tagggaataa agcgaccgtt attaattgtc aaaacaaaaa tgagtctatt 1260  
agagataatg gaaagtttat tctattagaa aaacttataa aggaaaataa agatggatat 1320  
tatataactt gtgatgatga tatccggtat cctgctgact acataaacac tatgataaaa 1380  
aaaattaata aatacaatga taaagcagca attggattac atgggtgttat attcccaagt 1440  
agagtcaaca agtatttttc atcagacaga attgtctata attttcaaaa acctttagaa 1500  
aatgatactg ctgtaaatat attaggaact ggaactgttg ccttttagagt atctattttt 1560  
aataaatttt ctctatctga ttttgagcat cctggcatgg tagatatcta tttttctata 1620  
ctatgtaaga aaaacaatat actccaagtt tgtatatcac gaccatcgaa ttggctaaca 1680  
gaagataaca aaaacactga gaccttattt catgaattcc aaaatagaga tgaaatacaa 1740  
agtaaaactca ttatttcaaa caacccttgg ggatactcaa gtatatatcc attattaaat 1800  
aataatgcta attattctga acttattccg tgtttatctt tttataacga gtaa 1854

<210> 70  
<211> 617  
<212> PRT  
<213> Pasteurella multocida

<400> 70

Met Ser Leu Phe Lys Arg Ala Thr Glu Leu Phe Lys Ser Gly Asn Tyr  
1 5 10 15

Lys Asp Ala Leu Thr Leu Tyr Glu Asn Ile Ala Lys Ile Tyr Gly Ser  
20 25 30

Glu Ser Leu Val Lys Tyr Asn Ile Asp Ile Cys Lys Lys Asn Ile Thr  
35 40 45

Gln Ser Lys Ser Asn Lys Ile Glu Glu Asp Asn Ile Ser Gly Glu Asn  
50 55 60

Lys Phe Ser Val Ser Ile Lys Asp Leu Tyr Asn Glu Ile Ser Asn Ser  
65 70 75 80

Glu Leu Gly Ile Thr Lys Glu Arg Leu Gly Ala Pro Pro Leu Val Ser  
85 90 95

Ile Ile Met Thr Ser His Asn Thr Glu Lys Phe Ile Glu Ala Ser Ile  
100 105 110

Asn Ser Leu Leu Leu Gln Thr Tyr Asn Asn Leu Glu Val Ile Val Val  
115 120 125

Asp Asp Tyr Ser Thr Asp Lys Thr Phe Gln Ile Ala Ser Arg Ile Ala  
130 135 140

Asn Ser Thr Ser Lys Val Lys Thr Phe Arg Leu Asn Ser Asn Leu Gly  
145 150 155 160

Thr Tyr Phe Ala Lys Asn Thr Gly Ile Leu Lys Ser Lys Gly Asp Ile  
165 170 175

Ile Phe Phe Gln Asp Ser Asp Asp Val Cys His His Glu Arg Ile Glu  
180 185 190

Arg Cys Val Asn Ala Leu Leu Ser Asn Lys Asp Asn Ile Ala Val Arg  
195 200 205

Cys Ala Tyr Ser Arg Ile Asn Leu Glu Thr Gln Asn Ile Ile Lys Val  
210 215 220

Asn Asp Asn Lys Tyr Lys Leu Gly Leu Ile Thr Leu Gly Val Tyr Arg  
225 230 235 240

Lys Val Phe Asn Glu Ile Gly Phe Phe Asn Cys Thr Thr Lys Ala Ser  
245 250 255

Asp Asp Glu Phe Tyr His Arg Ile Ile Lys Tyr Tyr Gly Lys Asn Arg  
260 265 270

Ile Asn Asn Leu Phe Leu Pro Leu Tyr Tyr Asn Thr Met Arg Glu Asp  
275 280 285

Ser Leu Phe Ser Asp Met Val Glu Trp Val Asp Glu Asn Asn Ile Lys  
290 295 300

Gln Lys Thr Ser Asp Ala Arg Gln Asn Tyr Leu His Glu Phe Gln Lys  
305 310 315 320

Ile His Asn Glu Arg Lys Leu Asn Glu Leu Lys Glu Ile Phe Ser Phe  
325 330 335

Pro Arg Ile His Asp Ala Leu Pro Ile Ser Lys Glu Met Ser Lys Leu  
340 345 350

Ser Asn Pro Lys Ile Pro Val Tyr Ile Asn Ile Cys Ser Ile Pro Ser  
355 360 365

Arg Ile Lys Gln Leu Gln Tyr Thr Ile Gly Val Leu Lys Asn Gln Cys  
370 375 380

Asp His Phe His Ile Tyr Leu Asp Gly Tyr Pro Glu Val Pro Asp Phe  
385 390 395 400

Ile Lys Lys Leu Gly Asn Lys Ala Thr Val Ile Asn Cys Gln Asn Lys  
405 410 415

Asn Glu Ser Ile Arg Asp Asn Gly Lys Phe Ile Leu Leu Glu Lys Leu  
420 425 430

Ile Lys Glu Asn Lys Asp Gly Tyr Tyr Ile Thr Cys Asp Asp Asp Ile  
435 440 445

Arg Tyr Pro Ala Asp Tyr Ile Asn Thr Met Ile Lys Lys Ile Asn Lys  
450 455 460

Tyr Asn Asp Lys Ala Ala Ile Gly Leu His Gly Val Ile Phe Pro Ser  
465 470 475 480

Arg Val Asn Lys Tyr Phe Ser Ser Asp Arg Ile Val Tyr Asn Phe Gln  
485 490 495

Lys Pro Leu Glu Asn Asp Thr Ala Val Asn Ile Leu Gly Thr Gly Thr  
500 505 510

Val Ala Phe Arg Val Ser Ile Phe Asn Lys Phe Ser Leu Ser Asp Phe  
515 520 525

Glu His Pro Gly Met Val Asp Ile Tyr Phe Ser Ile Leu Cys Lys Lys  
530 535 540

Asn Asn Ile Leu Gln Val Cys Ile Ser Arg Pro Ser Asn Trp Leu Thr  
 545 550 555 560

Glu Asp Asn Lys Asn Thr Glu Thr Leu Phe His Glu Phe Gln Asn Arg  
 565 570 575

Asp Glu Ile Gln Ser Lys Leu Ile Ile Ser Asn Asn Pro Trp Gly Tyr  
 580 585 590

Ser Ser Ile Tyr Pro Leu Leu Asn Asn Asn Ala Asn Tyr Ser Glu Leu  
 595 600 605

Ile Pro Cys Leu Ser Phe Tyr Asn Glu  
 610 615

<210> 71  
 <211> 2112  
 <212> DNA  
 <213> Pasteurella multocida

<400> 71  
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 aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaatt 180  
 aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt 240  
 tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg 300  
 aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc cttgtacca 360  
 aaagattttc ccaaagatct ggttttagcg cttttacctg atcatgttaa tgattttaca 420  
 tgggtacaaa agcgaagaa aagacttggc ataaaacctg aacatcaaca tgttggctctt 480  
 tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta 540  
 gtaaaccaaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600  
 gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa 660  
 aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat 720  
 gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat 780  
 gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat 840  
 acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca 900  
 gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg 960  
 cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt 1020  
 tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat 1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac 1140  
 ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa 1200  
 gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag 1260  
 gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct 1320  
 ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat 1380  
 agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca 1440  
 gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg 1500  
 tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt 1560  
 tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt 1620  
 ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc 1680  
 aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa 1740  
 ctcacaacgg ctatgattgc tcaccacttt agaattgtca cgattagagc ttggcattta 1800  
 actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaaactc 1860  
 agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt 1920  
 gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat 1980  
 cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040  
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 aaagatatatt aa 2112

<210> 72  
 <211> 107  
 <212> PRT  
 <213> Pasteurella multocida

<400> 72

Ser Ile Ile Val Thr Thr Phe Asn Arg Pro Ala Ile Leu Ser Ile Thr  
 1 5 10 15

Leu Ala Cys Leu Val Asn Gln Lys Thr His Tyr Pro Phe Glu Val Ile  
 20 25 30

Val Thr Asp Asp Gly Ser Gln Glu Asp Leu Ser Pro Ile Ile Arg Gln  
 35 40 45

Tyr Glu Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Asn Gly  
 50 55 60

Phe Gln Ala Ser Ala Ala Arg Asn Met Gly Leu Arg Leu Ala Lys Tyr  
 65 70 75 80

Asp Phe Ile Gly Leu Leu Asp Cys Asp Met Ala Pro Asn Pro Leu Trp  
85 90 95

Val His Ser Tyr Val Ala Glu Leu Leu Glu Asp  
100 105

<210> 73  
<211> 105  
<212> PRT  
<213> Pasteurella multocida

<400> 73

Ser Ile Tyr Ile Pro Ala Tyr Asn Cys Ala Asn Tyr Ile Gln Arg Cys  
1 5 10 15

Val Asp Ser Ala Leu Asn Gln Thr Thr Val Asp Leu Glu Val Cys Ile  
20 25 30

Cys Asn Asp Gly Ser Thr Asp Asn Thr Leu Glu Val Ile Asn Lys Leu  
35 40 45

Tyr Gly Asn Asn Pro Arg Val Arg Ile Met Ser Lys Pro Asn Gly Gly  
50 55 60

Ile Ala Ser Ala Ser Asn Ala Ala Val Ser Phe Ala Lys Gly Tyr Tyr  
65 70 75 80

Ile Gly Gln Leu Asp Ser Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu  
85 90 95

Leu Cys Leu Lys Glu Phe Leu Lys Asp  
100 105

<210> 74  
<211> 771  
<212> PRT  
<213> Pasteurella multocida

<400> 74

Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr  
1 5 10 15

Gln Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Ile Tyr Gly Arg  
20 25 30

Lys Ile Val Glu Phe Gln Ile Thr Lys Cys Lys Glu Lys Leu Ser Ala  
35 40 45

His Pro Ser Val Asn Ser Ala His Leu Ser Val Asn Lys Glu Glu Lys  
50 55 60

Val Asn Val Cys Asp Ser Pro Leu Asp Ile Ala Thr Gln Leu Leu Leu  
65 70 75 80

Ser Asn Val Lys Lys Leu Val Leu Ser Asp Ser Glu Lys Asn Thr Leu  
85 90 95

Lys Asn Lys Trp Lys Leu Leu Thr Glu Lys Lys Ser Glu Asn Ala Glu  
100 105 110

Val Arg Ala Val Ala Leu Val Pro Lys Asp Phe Pro Lys Asp Leu Val  
115 120 125

Leu Ala Pro Leu Pro Asp His Val Asn Asp Phe Thr Trp Tyr Lys Lys  
130 135 140

Arg Lys Lys Arg Leu Gly Ile Lys Pro Glu His Gln His Val Gly Leu  
145 150 155 160

Ser Ile Ile Val Thr Thr Phe Asn Arg Pro Ala Ile Leu Ser Ile Thr  
165 170 175

Leu Ala Cys Leu Val Asn Gln Lys Thr His Tyr Pro Phe Glu Val Ile  
180 185 190

Val Thr Asp Asp Gly Ser Gln Glu Asp Leu Ser Pro Ile Ile Arg Gln  
195 200 205

Tyr Glu Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Asn Gly  
210 215 220

Phe Gln Ala Ser Ala Ala Arg Asn Met Gly Leu Arg Leu Ala Lys Tyr  
225 230 235 240

Asp Phe Ile Gly Leu Leu Asp Cys Asp Met Ala Pro Asn Pro Leu Trp  
245 250 255

Val His Ser Tyr Val Ala Glu Leu Leu Val Gln Lys Tyr Glu Gln Lys  
260 265 270

Leu Asp Ile Lys Tyr Val Arg Gln Lys Asp Tyr Gly Tyr Gln Leu Cys  
275 280 285

Ala Val Arg Asn Leu Gly Leu Arg Thr Ala Lys Tyr Asp Phe Val Ser  
290 295 300

Ile Leu Asp Cys Asp Met Ala Pro Gln Gln Leu Trp Val His Ser Tyr  
305 310 315 320

Leu Thr Glu Leu Leu Glu Asp Asn Asp Ile Val Leu Ile Gly Pro Arg  
325 330 335

Lys Tyr Val Asp Thr His Asn Ile Thr Ala Glu Gln Phe Leu Asn Asp  
340 345 350

Pro Tyr Leu Ile Glu Ser Leu Pro Glu Thr Ala Thr Asn Asn Asn Pro  
355 360 365

Ser Ile Thr Ser Lys Gly Asn Ile Ser Leu Asp Trp Arg Leu Glu His  
370 375 380

Phe Lys Lys Thr Asp Asn Leu Arg Leu Cys Asp Ser Pro Phe Arg Tyr  
385 390 395 400

Phe Ser Cys Gly Asn Val Ala Phe Ser Lys Glu Trp Leu Asn Lys Val  
405 410 415

Gly Trp Phe Asp Glu Glu Phe Asn His Trp Gly Gly Glu Asp Val Glu  
420 425 430

Phe Gly Tyr Arg Leu Phe Ala Lys Gly Cys Phe Phe Arg Val Ile Asp  
435 440 445

Gly Gly Met Ala Tyr His Gln Glu Pro Pro Gly Lys Glu Asn Glu Thr  
450 455 460

Asp Arg Glu Ala Gly Lys Ser Ile Thr Leu Lys Ile Val Lys Glu Lys  
465 470 475 480

Val Pro Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu Asp Ser His Ile  
485 490 495

His Arg Ile Pro Leu Val Ser Ile Tyr Ile Pro Ala Tyr Asn Cys Ala  
500 505 510

Asn Tyr Ile Gln Arg Cys Val Asp Ser Ala Leu Asn Gln Thr Val Val  
515 520 525

Asp Leu Glu Val Cys Ile Cys Asn Asp Gly Ser Thr Asp Asn Thr Leu  
530 535 540

Glu Val Ile Asn Lys Leu Tyr Gly Asn Asn Pro Arg Val Arg Ile Met  
545 550 555 560

Ser Lys Pro Asn Gly Gly Ile Ala Ser Ala Ser Asn Ala Ala Val Ser  
565 570 575



Phe Ala Lys Gly Tyr Tyr Ile Gly Gln Leu Asp Ser Asp Asp Tyr Leu  
580 585 590

Glu Pro Asp Ala Val Glu Leu Cys Leu Lys Glu Phe Leu Lys Asp Lys  
595 600 605

Thr Leu Ala Cys Val Tyr Thr Thr Asn Arg Asn Val Asn Pro Asp Gly  
610 615 620

Ser Leu Ile Ala Asn Gly Tyr Asn Trp Pro Glu Phe Ser Arg Glu Lys  
625 630 635 640

Leu Thr Thr Ala Met Ile Ala His His Phe Arg Met Phe Thr Ile Arg  
645 650 655

Ala Trp His Leu Thr Asp Gly Phe Asn Glu Asn Ile Glu Asn Ala Val  
660 665 670

Asp Tyr Asp Met Phe Leu Lys Leu Ser Glu Val Gly Lys Phe Lys His  
675 680 685

Leu Asn Lys Ile Cys Tyr Asn Arg Val Leu His Gly Asp Asn Thr Ser  
690 695 700

Ile Lys Lys Leu Gly Ile Gln Lys Lys Asn His Phe Val Val Val Asn  
705 710 715 720

Gln Ser Leu Asn Arg Gln Gly Ile Asn Tyr Tyr Asn Tyr Asp Lys Phe  
725 730 735

Asp Asp Leu Asp Glu Ser Arg Lys Tyr Ile Phe Asn Lys Thr Ala Glu  
740 745 750

Tyr Gln Glu Glu Met Asp Ile Leu Lys Asp Leu Lys Leu Ile Gln Asn  
755 760 765

Lys Asp Ala  
770

<210> 75  
<211> 696  
<212> PRT  
<213> Pasteurella multocida

<400> 75

Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr  
1 5 10 15

Glu Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Thr Tyr Gly Arg  
 20 25 30  
 Lys Ile Val Glu Phe Gln Ile Ile Lys Cys Lys Glu Lys Leu Ser Thr  
 35 40 45  
 Asn Ser Tyr Val Ser Glu Asp Lys Lys Asn Ser Val Cys Asp Ser Ser  
 50 55 60  
 Leu Asp Ile Ala Thr Gln Leu Leu Leu Ser Asn Val Lys Lys Leu Thr  
 65 70 75 80  
 Leu Ser Glu Ser Glu Lys Asn Ser Leu Lys Asn Lys Trp Lys Ser Ile  
 85 90 95  
 Thr Gly Lys Lys Ser Glu Asn Ala Glu Ile Arg Lys Val Glu Leu Val  
 100 105 110  
 Pro Lys Asp Phe Pro Lys Asp Leu Val Leu Ala Pro Leu Pro Asp His  
 115 120 125  
 Val Asn Asp Phe Thr Trp Tyr Lys Asn Arg Lys Lys Ser Leu Gly Ile  
 130 135 140  
 Lys Pro Val Asn Lys Asn Ile Gly Leu Ser Ile Ile Ile Pro Thr Phe  
 145 150 155 160  
 Asn Arg Ser Arg Ile Leu Asp Ile Thr Leu Ala Cys Leu Val Asn Gln  
 165 170 175  
 Lys Thr Asn Tyr Pro Phe Glu Val Val Val Ala Asp Asp Gly Ser Lys  
 180 185 190  
 Glu Asn Leu Leu Thr Ile Ile Arg Gln Tyr Glu Asn Lys Leu Asp Ile  
 195 200 205  
 Arg Tyr Val Arg Gln Lys Asp Asn Gly Phe Gln Ala Ser Ala Ala Arg  
 210 215 220  
 Asn Met Gly Leu Arg Leu Ala Lys Tyr Asp Phe Ile Gly Leu Leu Asp  
 225 230 235 240  
 Cys Asp Met Ala Pro Asn Pro Leu Trp Val His Ser Tyr Val Ala Glu  
 245 250 255  
 Leu Leu Glu Asp Asp Asp Leu Thr Ile Ile Gly Pro Arg Lys Tyr Ile  
 260 265 270

Asp Thr Gln His Ile Asp Pro Lys Asp Phe Leu Asn Asn Ala Ser Leu  
275 280 285

Leu Glu Ser Leu Pro Glu Val Lys Thr Asn Asn Ser Val Ala Ala Lys  
290 295 300

Gly Glu Gly Thr Val Ser Leu Asp Trp Arg Leu Glu Gln Phe Glu Lys  
305 310 315 320

Thr Glu Asn Leu Arg Leu Ser Asp Ser Pro Phe Arg Phe Phe Ala Ala  
325 330 335

Gly Asn Val Ala Phe Ala Lys Lys Trp Leu Asn Lys Ser Gly Phe Phe  
340 345 350

Asp Glu Glu Phe Asn His Trp Gly Gly Glu Asp Val Glu Phe Gly Tyr  
355 360 365

Arg Leu Phe Arg Tyr Gly Ser Phe Phe Lys Thr Ile Asp Gly Ile Met  
370 375 380

Ala Tyr His Gln Glu Pro Pro Gly Lys Glu Asn Glu Thr Asp Arg Glu  
385 390 395 400

Ala Gly Lys Asn Ile Thr Leu Asp Ile Met Arg Glu Lys Val Pro Tyr  
405 410 415

Ile Tyr Arg Lys Leu Leu Pro Ile Glu Asp Ser His Ile Asn Arg Val  
420 425 430

Pro Leu Val Ser Ile Tyr Ile Pro Ala Tyr Asn Cys Ala Asn Tyr Ile  
435 440 445

Gln Arg Cys Val Asp Ser Ala Leu Asn Gln Thr Val Val Asp Leu Glu  
450 455 460

Val Cys Ile Cys Asn Asp Gly Ser Thr Asp Asn Thr Leu Glu Val Ile  
465 470 475 480

Asn Lys Leu Tyr Gly Asn Asn Pro Arg Val Arg Ile Met Ser Lys Pro  
485 490 495

Asn Gly Gly Ile Ala Ser Ala Ser Asn Ala Ala Val Ser Phe Ala Lys  
500 505 510

Gly Tyr Tyr Ile Gly Gln Leu Asp Ser Asp Asp Tyr Leu Glu Pro Asp  
515 520 525

Ala Val Glu Leu Cys Leu Lys Glu Phe Leu Lys Asp Lys Thr Leu Ala  
530 535 540

Cys Val Tyr Thr Thr Asn Arg Asn Val Asn Pro Asp Gly Ser Leu Ile  
545 550 555 560

Ala Asn Gly Tyr Asn Trp Pro Glu Phe Ser Arg Glu Lys Leu Thr Thr  
565 570 575

Ala Met Ile Ala His His Phe Arg Met Phe Thr Ile Arg Ala Trp His  
580 585 590

Leu Thr Asp Gly Phe Asn Glu Lys Ile Glu Asn Ala Val Asp Tyr Asp  
595 600 605

Met Phe Leu Lys Leu Ser Glu Val Gly Lys Phe Lys His Leu Asn Lys  
610 615 620

Ile Cys Tyr Asn Arg Val Leu His Gly Asp Asn Thr Ser Ile Lys Lys  
625 630 635 640

Leu Gly Ile Gln Lys Lys Asn His Phe Val Val Val Asn Gln Ser Leu  
645 650 655

Asn Arg Gln Gly Ile Thr Tyr Tyr Asn Tyr Asp Glu Phe Asp Asp Leu  
660 665 670

Asp Glu Ser Arg Lys Tyr Ile Phe Asn Lys Thr Ala Glu Tyr Gln Glu  
675 680 685

Glu Ile Asp Ile Leu Lys Asp Ile  
690 695

<210> 76  
<211> 711  
<212> PRT  
<213> Pasteurella multocida

<400> 76

Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr  
1 5 10 15

Gln Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Ile Tyr Gly Arg  
20 25 30

Lys Ile Val Glu Phe Gln Ile Thr Lys Cys Lys Glu Lys Leu Ser Ala  
35 40 45

His Pro Ser Val Asn Ser Ala His Leu Ser Val Asn Lys Glu Glu Lys  
 50 55 60  
 Val Asn Val Cys Asp Ser Pro Leu Asp Ile Ala Thr Gln Leu Leu Leu  
 65 70 75 80  
 Ser Asn Val Lys Lys Leu Val Leu Ser Asp Ser Glu Lys Asn Thr Leu  
 85 90 95  
 Lys Asn Lys Trp Lys Leu Leu Thr Glu Lys Lys Ser Glu Asn Ala Glu  
 100 105 110  
 Val Arg Ala Val Ala Leu Val Pro Lys Asp Phe Pro Lys Asp Leu Val  
 115 120 125  
 Leu Ala Pro Leu Pro Asp His Val Asn Asp Phe Thr Trp Tyr Lys Lys  
 130 135 140  
 Arg Lys Lys Arg Leu Gly Ile Lys Pro Glu His Gln His Val Gly Leu  
 145 150 155 160  
 Ser Ile Ile Val Thr Thr Phe Asn Arg Pro Ala Ile Leu Ser Ile Thr  
 165 170 175  
 Leu Ala Cys Leu Val Asn Gln Lys Thr His Tyr Pro Phe Glu Val Ile  
 180 185 190  
 Val Thr Asp Asp Gly Ser Gln Glu Asp Leu Ser Pro Ile Ile Arg Gln  
 195 200 205  
 Tyr Glu Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Tyr Gly  
 210 215 220  
 Tyr Gln Leu Cys Ala Val Arg Asn Leu Gly Leu Arg Thr Ala Lys Tyr  
 225 230 235 240  
 Asp Phe Val Ser Ile Leu Asp Cys Asp Met Ala Pro Gln Gln Leu Trp  
 245 250 255  
 Val His Ser Tyr Leu Thr Glu Leu Leu Glu Asp Asn Asp Ile Val Leu  
 260 265 270  
 Ile Gly Pro Arg Lys Tyr Val Asp Thr His Asn Ile Thr Ala Glu Gln  
 275 280 285  
 Phe Leu Asn Asp Pro Tyr Leu Ile Glu Ser Leu Pro Glu Thr Ala Thr  
 290 295 300

Asn Asn Asn Pro Ser Ile Thr Ser Lys Gly Asn Ile Ser Leu Asp Trp  
 305 310 315 320  
 Arg Leu Glu His Phe Lys Lys Thr Asp Asn Leu Arg Leu Cys Asp Ser  
 325 330 335  
 Pro Phe Arg Tyr Phe Ser Cys Gly Asn Val Ala Phe Ser Lys Glu Trp  
 340 345 350  
 Leu Asn Lys Val Gly Trp Phe Asp Glu Glu Phe Asn His Trp Gly Gly  
 355 360 365  
 Glu Asp Val Glu Phe Gly Tyr Arg Leu Phe Ala Lys Gly Cys Phe Phe  
 370 375 380  
 Arg Val Ile Asp Gly Gly Met Ala Tyr His Gln Glu Pro Pro Gly Lys  
 385 390 395 400  
 Glu Asn Glu Thr Asp Arg Glu Ala Gly Lys Ser Ile Thr Leu Lys Ile  
 405 410 415  
 Val Lys Glu Lys Val Pro Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu  
 420 425 430  
 Asp Ser His Ile His Arg Ile Pro Leu Val Ser Ile Tyr Ile Pro Ala  
 435 440 445  
 Tyr Asn Cys Ala Asn Tyr Ile Gln Arg Cys Val Asp Ser Ala Leu Asn  
 450 455 460  
 Gln Thr Val Val Asp Leu Glu Val Cys Ile Cys Asn Asp Gly Ser Thr  
 465 470 475 480  
 Asp Asn Thr Leu Glu Val Ile Asn Lys Leu Tyr Gly Asn Asn Pro Arg  
 485 490 495  
 Val Arg Ile Met Ser Lys Pro Asn Gly Gly Ile Ala Ser Ala Ser Asn  
 500 505 510  
 Ala Ala Val Ser Phe Ala Lys Gly Tyr Tyr Ile Gly Gln Leu Asp Ser  
 515 520 525  
 Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu Leu Cys Leu Lys Glu Phe  
 530 535 540  
 Leu Lys Asp Lys Thr Leu Ala Cys Val Tyr Thr Thr Asn Arg Asn Val  
 545 550 555 560

Asn Pro Asp Gly Ser Leu Ile Ala Asn Gly Tyr Asn Trp Pro Glu Phe  
565 570 575

Ser Arg Glu Lys Leu Thr Thr Ala Met Ile Ala His His Phe Arg Met  
580 585 590

Phe Thr Ile Arg Ala Trp His Leu Thr Asp Gly Phe Asn Glu Asn Ile  
595 600 605

Glu Asn Ala Val Asp Tyr Asp Met Phe Leu Lys Leu Ser Glu Val Gly  
610 615 620

Lys Phe Lys His Leu Asn Lys Ile Cys Tyr Asn Arg Val Leu His Gly  
625 630 635 640

Asp Asn Thr Ser Ile Lys Lys Leu Gly Ile Gln Lys Lys Asn His Phe  
645 650 655

Val Val Val Asn Gln Ser Leu Asn Arg Gln Gly Ile Asn Tyr Tyr Asn  
660 665 670

Tyr Asp Lys Phe Asp Asp Leu Asp Glu Ser Arg Lys Tyr Ile Phe Asn  
675 680 685

Lys Thr Ala Glu Tyr Gln Glu Glu Met Asp Ile Leu Lys Asp Leu Lys  
690 695 700

Leu Ile Gln Asn Lys Asp Ala  
705 710

<210> 77  
<211> 696  
<212> PRT  
<213> Pasteurella multocida

<400> 77

Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr  
1 5 10 15

Glu Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Thr Tyr Gly Arg  
20 25 30

Lys Ile Val Glu Phe Gln Ile Ile Lys Cys Lys Glu Lys Leu Ser Thr  
35 40 45

Asn Ser Tyr Val Ser Glu Asp Lys Lys Asn Ser Val Cys Asp Ser Ser  
50 55 60

Leu Asp Ile Ala Thr Gln Leu Leu Leu Ser Asn Val Lys Lys Leu Thr  
Page 103

65		70		75		80
Leu Ser Glu Ser	Glu Lys Asn Ser	Leu Lys Asn Lys Trp Lys	Ser Ile			
	85	90	95			
Thr Gly Lys Lys	Ser Glu Asn Ala	Glu Ile Arg Lys Val	Glu Leu Val			
	100	105	110			
Pro Lys Asp Phe	Pro Lys Asp	Leu Val Leu Ala Pro	Leu Pro Asp His			
	115	120	125			
Val Asn Asp Phe	Thr Trp Tyr	Lys Asn Arg Lys Lys	Ser Leu Gly Ile			
	130	135	140			
Lys Pro Val Asn	Lys Asn Ile Gly	Leu Ser Ile Ile Ile	Pro Thr Phe			
	145	150	155	160		
Asn Arg Ser Arg	Ile Leu Asp Ile	Thr Leu Ala Cys	Leu Val Asn Gln			
	165	170	175			
Lys Thr Asn Tyr	Pro Phe Glu Val	Val Val Ala Asp Asp	Gly Ser Lys			
	180	185	190			
Glu Asn Leu Leu	Thr Ile Val Gln	Lys Tyr Glu Gln	Lys Leu Asp Ile			
	195	200	205			
Lys Tyr Val Arg	Gln Lys Asp Asn	Gly Phe Gln Ala	Ser Ala Ala Arg			
	210	215	220			
Asn Met Gly Leu	Arg Leu Ala Lys	Tyr Asp Phe Ile	Gly Leu Leu Asp			
	225	230	235	240		
Cys Asp Met Ala	Pro Asn Pro Leu	Trp Val His Ser Tyr	Val Ala Glu			
	245	250	255			
Leu Leu Glu Asp	Asp Asp Leu Thr	Ile Ile Gly Pro Arg	Lys Tyr Ile			
	260	265	270			
Asp Thr Gln His	Ile Asp Pro Lys	Asp Phe Leu Asn	Asn Ala Ser Leu			
	275	280	285			
Leu Glu Ser Leu	Pro Glu Val Lys	Thr Asn Asn Ser	Val Ala Ala Lys			
	290	295	300			
Gly Glu Gly Thr	Val Ser Leu Asp	Trp Arg Leu Glu	Gln Phe Glu Lys			
	305	310	315	320		
Thr Glu Asn Leu	Arg Leu Ser Asp	Ser Pro Phe Arg	Phe Phe Ala Ala			



325										330					335				
Gly	Asn	Val	Ala	Phe	Ala	Lys	Lys	Trp	Leu	Asn	Lys	Ser	Gly	Phe	Phe				
			340					345					350						
Asp	Glu	Glu	Phe	Asn	His	Trp	Gly	Gly	Glu	Asp	Val	Glu	Phe	Gly	Tyr				
		355					360					365							
Arg	Leu	Phe	Arg	Tyr	Gly	Ser	Phe	Phe	Lys	Thr	Ile	Asp	Gly	Ile	Met				
	370					375					380								
Ala	Tyr	His	Gln	Glu	Pro	Pro	Gly	Lys	Glu	Asn	Glu	Thr	Asp	Arg	Glu				
	385				390					395					400				
Ala	Gly	Lys	Asn	Ile	Thr	Leu	Asp	Ile	Met	Arg	Glu	Lys	Val	Pro	Tyr				
			405						410					415					
Ile	Tyr	Arg	Lys	Leu	Leu	Pro	Ile	Glu	Asp	Ser	His	Ile	Asn	Arg	Val				
			420					425					430						
Pro	Leu	Val	Ser	Ile	Tyr	Ile	Pro	Ala	Tyr	Asn	Cys	Ala	Asn	Tyr	Ile				
		435					440					445							
Gln	Arg	Cys	Val	Asp	Ser	Ala	Leu	Asn	Gln	Thr	Val	Val	Asp	Leu	Glu				
	450					455					460								
Val	Cys	Ile	Cys	Asn	Asp	Gly	Ser	Thr	Asp	Asn	Thr	Leu	Glu	Val	Ile				
	465				470					475					480				
Asn	Lys	Leu	Tyr	Gly	Asn	Asn	Pro	Arg	Val	Arg	Ile	Met	Ser	Lys	Pro				
				485					490					495					
Asn	Gly	Gly	Ile	Ala	Ser	Ala	Ser	Asn	Ala	Ala	Val	Ser	Phe	Ala	Lys				
			500					505					510						
Gly	Tyr	Tyr	Ile	Gly	Gln	Leu	Asp	Ser	Asp	Asp	Tyr	Leu	Glu	Pro	Asp				
		515					520					525							
Ala	Val	Glu	Leu	Cys	Leu	Lys	Glu	Phe	Leu	Lys	Asp	Lys	Thr	Leu	Ala				
	530					535					540								
Cys	Val	Tyr	Thr	Thr	Asn	Arg	Asn	Val	Asn	Pro	Asp	Gly	Ser	Leu	Ile				
	545				550					555					560				
Ala	Asn	Gly	Tyr	Asn	Trp	Pro	Glu	Phe	Ser	Arg	Glu	Lys	Leu	Thr	Thr				
				565					570					575					

580                      585                      590  
 Leu Thr Asp Gly Phe Asn Glu Lys Ile Glu Asn Ala Val Asp Tyr Asp  
                     595                      600                      605  
 Met Phe Leu Lys Leu Ser Glu Val Gly Lys Phe Lys His Leu Asn Lys  
                     610                      615                      620  
 Ile Cys Tyr Asn Arg Val Leu His Gly Asp Asn Thr Ser Ile Lys Lys  
                     625                      630                      635                      640  
 Leu Gly Ile Gln Lys Lys Asn His Phe Val Val Val Asn Gln Ser Leu  
                     645                      650                      655  
 Asn Arg Gln Gly Ile Thr Tyr Tyr Asn Tyr Asp Glu Phe Asp Asp Leu  
                     660                      665                      670  
 Asp Glu Ser Arg Lys Tyr Ile Phe Asn Lys Thr Ala Glu Tyr Gln Glu  
                     675                      680                      685  
 Glu Ile Asp Ile Leu Lys Asp Ile  
                     690                      695

<210> 78  
 <211> 40  
 <212> PRT  
 <213> Pasteurella multocida  
 <400> 78

Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Asn Gly Phe Gln  
 1                      5                      10                      15  
 Ala Ser Ala Ala Arg Asn Met Gly Leu Arg Leu Ala Lys Tyr Asp Phe  
                     20                      25                      30  
 Ile Gly Leu Leu Asp Cys Asp Met  
                     35                      40

<210> 79  
 <211> 40  
 <212> PRT  
 <213> Pasteurella multocida  
 <400> 79

Gln Lys Leu Asp Ile Lys Tyr Val Arg Gln Lys Asp Tyr Gly Tyr Gln  
 1                      5                      10                      15  
 Leu Cys Ala Val Arg Asn Leu Gly Leu Arg Thr Ala Lys Tyr Asp Phe  
                     20                      25                      30

Val Ser Ile Leu Asp Cys Asp Met  
35 40

<210> 80  
<211> 40  
<212> PRT  
<213> Meleagris gallopavo

<400> 80

Glu Lys Leu Asp Ile Lys Tyr Val Arg Gln Lys Asp Tyr Gly Tyr Gln  
1 5 10 15

Leu Cys Ala Val Arg Asn Leu Gly Leu Arg Thr Ala Lys Tyr Asp Phe  
20 25 30

Val Ser Ile Leu Asp Cys Asp Met  
35 40

<210> 81  
<211> 36  
<212> PRT  
<213> Goose

<400> 81

Val Asp Ile Lys Tyr Val Arg Gln Lys Asp Tyr Gly Tyr Gln Leu Cys  
1 5 10 15

Ala Val Arg Asn Leu Gly Leu Arg Thr Ala Lys Tyr Asp Phe Val Ser  
20 25 30

Ile Leu Asp Cys  
35

<210> 82  
<211> 33  
<212> PRT  
<213> sea lion

<400> 82

Lys Tyr Val Arg Gln Lys Asp Tyr Gly Tyr Gln Leu Cys Ala Val Arg  
1 5 10 15

Asn Leu Gly Leu Arg Thr Ala Lys Tyr Asp Phe Val Ser Ile Leu Asp  
20 25 30

Cys

<210> 83  
<211> 35

<212> PRT  
<213> Artificial sequence

<220>  
<223> Consensus of SEQ ID NOS:78-82

<220>  
<221> misc\_feature  
<222> (12)..(12)  
<223> Xaa can be any naturally occurring amino acid

<220>  
<221> misc\_feature  
<222> (20)..(20)  
<223> Xaa can be any naturally occurring amino acid

<220>  
<221> misc\_feature  
<222> (30)..(30)  
<223> Xaa can be any naturally occurring amino acid

<400> 83

Asp Ile Lys Tyr Val Arg Gln Lys Asp Tyr Gly Xaa Gln Leu Cys Ala  
1 5 10 15

Val Arg Asn Xaa Gly Leu Arg Thr Ala Lys Tyr Asp Phe Xaa Ser Ile  
20 25 30

Leu Asp Cys  
35

<210> 84  
<211> 703  
<212> PRT  
<213> Pasteurella multocida

<400> 84

Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr  
1 5 10 15

Gln Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Ile Tyr Gly Arg  
20 25 30

Lys Ile Val Glu Phe Gln Ile Thr Lys Cys Lys Glu Lys Leu Ser Ala  
35 40 45

His Pro Ser Val Asn Ser Ala His Leu Ser Val Asn Lys Glu Glu Lys  
50 55 60

Val Asn Val Cys Asp Ser Pro Leu Asp Ile Ala Thr Gln Leu Leu Leu  
65 70 75 80

Ser Asn Val Lys Lys Leu Val Leu Ser Asp Ser Glu Lys Asn Thr Leu  
Page 108



340					345					350					
Leu	Asn	Lys 355	Ser	Gly	Phe	Phe	Asp 360	Glu	Glu	Phe	Asn	His 365	Trp	Gly	Gly
Glu	Asp 370	Val	Glu	Phe	Gly	Tyr 375	Arg	Leu	Phe	Arg	Tyr 380	Gly	Ser	Phe	Phe
Lys 385	Thr	Ile	Asp	Gly	Ile 390	Met	Ala	Tyr	His	Gln 395	Glu	Pro	Pro	Gly	Lys 400
Glu	Asn	Glu	Thr	Asp 405	Arg	Glu	Ala	Gly	Lys 410	Asn	Ile	Thr	Leu	Asp 415	Ile
Met	Arg	Glu	Lys 420	Val	Pro	Tyr	Ile	Tyr 425	Arg	Lys	Leu	Leu	Pro	Ile	Glu
Asp	Ser	His 435	Ile	Asn	Arg	Val	Pro 440	Leu	Val	Ser	Ile	Tyr 445	Ile	Pro	Ala
Tyr	Asn 450	Cys	Ala	Asn	Tyr	Ile 455	Gln	Arg	Cys	Val	Asp 460	Ser	Ala	Leu	Asn
Gln 465	Thr	Val	Val	Asp	Leu 470	Glu	Val	Cys	Ile	Cys 475	Asn	Asp	Gly	Ser	Thr 480
Asp	Asn	Thr	Leu	Glu 485	Val	Ile	Asn	Lys	Leu 490	Tyr	Gly	Asn	Asn	Pro 495	Arg
Val	Arg	Ile	Met 500	Ser	Lys	Pro	Asn	Gly 505	Gly	Ile	Ala	Ser	Ala 510	Ser	Asn
Ala	Ala	Val 515	Ser	Phe	Ala	Lys	Gly 520	Tyr	Tyr	Ile	Gly	Gln 525	Leu	Asp	Ser
Asp	Asp 530	Tyr	Leu	Glu	Pro	Asp 535	Ala	Val	Glu	Leu	Cys 540	Leu	Lys	Glu	Phe
Leu 545	Lys	Asp	Lys	Thr	Leu 550	Ala	Cys	Val	Tyr	Thr 555	Thr	Asn	Arg	Asn	Val 560
Asn	Pro	Asp	Gly	Ser 565	Leu	Ile	Ala	Asn	Gly 570	Tyr	Asn	Trp	Pro	Glu 575	Phe
Ser	Arg	Glu	Lys 580	Leu	Thr	Thr	Ala	Met 585	Ile	Ala	His	His	Phe 590	Arg	Met
Phe	Thr	Ile	Arg	Ala	Trp	His	Leu	Thr	Asp	Gly	Phe	Asn	Glu	Lys	Ile

595                      600                      605  
 Glu Asn Ala Val Asp Tyr Asp Met Phe Leu Lys Leu Ser Glu Val Gly  
     610                      615                      620  
 Lys Phe Lys His Leu Asn Lys Ile Cys Tyr Asn Arg Val Leu His Gly  
     625                      630                      635                      640  
 Asp Asn Thr Ser Ile Lys Lys Leu Gly Ile Gln Lys Lys Asn His Phe  
                 645                      650                      655  
 Val Val Val Asn Gln Ser Leu Asn Arg Gln Gly Ile Thr Tyr Tyr Asn  
                 660                      665                      670  
 Tyr Asp Glu Phe Asp Asp Leu Asp Glu Ser Arg Lys Tyr Ile Phe Asn  
                 675                      680                      685  
 Lys Thr Ala Glu Tyr Gln Glu Glu Ile Asp Ile Leu Lys Asp Ile  
                 690                      695                      700

<210> 85  
 <211> 705  
 <212> PRT  
 <213> Pasteurella multocida

<400> 85

Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr  
     1                      5                      10                      15  
 Glu Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Thr Tyr Gly Arg  
                 20                      25                      30  
 Lys Ile Val Glu Phe Gln Ile Ile Lys Cys Lys Glu Lys Leu Ser Thr  
                 35                      40                      45  
 Asn Ser Tyr Val Ser Glu Asp Lys Lys Asn Ser Val Cys Asp Ser Ser  
                 50                      55                      60  
 Leu Asp Ile Ala Thr Gln Leu Leu Leu Ser Asn Val Lys Lys Leu Thr  
     65                      70                      75                      80  
 Leu Ser Glu Ser Glu Lys Asn Ser Leu Lys Asn Lys Trp Lys Ser Ile  
                 85                      90                      95  
 Thr Gly Lys Lys Ser Glu Asn Ala Glu Ile Arg Lys Val Glu Leu Val  
                 100                      105                      110  
 Pro Lys Asp Phe Pro Lys Asp Leu Val Leu Ala Pro Leu Pro Asp His  
                 115                      120                      125

Val Asn Asp Phe Thr Trp Tyr Lys Asn Arg Lys Lys Ser Leu Gly Ile  
130 135 140  
Lys Pro Val Asn Lys Asn Ile Gly Leu Ser Ile Ile Ile Pro Thr Phe  
145 150 155 160  
Asn Arg Ser Arg Ile Leu Asp Ile Thr Leu Ala Cys Leu Val Asn Gln  
165 170 175  
Lys Thr Asn Tyr Pro Phe Glu Val Val Val Ala Asp Asp Gly Ser Lys  
180 185 190  
Glu Asn Leu Leu Thr Ile Val Gln Lys Tyr Glu Gln Lys Leu Asp Ile  
195 200 205  
Lys Tyr Val Arg Gln Lys Asp Asn Gly Phe Gln Ala Ser Ala Ala Arg  
210 215 220  
Asn Met Gly Leu Arg Leu Ala Lys Tyr Asp Phe Ile Gly Leu Leu Asp  
225 230 235 240  
Cys Asp Met Ala Pro Asn Pro Leu Trp Val His Ser Tyr Val Ala Glu  
245 250 255  
Leu Leu Leu Glu Asp Asn Asp Ile Val Leu Ile Gly Pro Arg Lys Tyr  
260 265 270  
Val Asp Thr His Asn Ile Thr Ala Glu Gln Phe Leu Asn Asp Pro Tyr  
275 280 285  
Leu Ile Glu Ser Leu Pro Glu Thr Ala Thr Asn Asn Asn Pro Ser Ile  
290 295 300  
Thr Ser Lys Gly Asn Ile Ser Leu Asp Trp Arg Leu Glu His Phe Lys  
305 310 315 320  
Lys Thr Asp Asn Leu Arg Leu Cys Asp Ser Pro Phe Arg Tyr Phe Ser  
325 330 335  
Cys Gly Asn Val Ala Phe Ser Lys Glu Trp Leu Asn Lys Val Gly Trp  
340 345 350  
Phe Asp Glu Glu Phe Asn His Trp Gly Gly Glu Asp Val Glu Phe Gly  
355 360 365  
Tyr Arg Leu Phe Ala Lys Gly Cys Phe Phe Arg Val Ile Asp Gly Gly  
370 375 380



Met Ala Tyr His Gln Glu Pro Pro Gly Lys Glu Asn Glu Thr Asp Arg  
385 390 395 400

Glu Ala Gly Lys Ser Ile Thr Leu Lys Ile Val Lys Glu Lys Val Pro  
405 410 415

Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu Asp Ser His Ile His Arg  
420 425 430

Ile Pro Leu Val Ser Ile Tyr Ile Pro Ala Tyr Asn Cys Ala Asn Tyr  
435 440 445

Ile Gln Arg Cys Val Asp Ser Ala Leu Asn Gln Thr Val Val Asp Leu  
450 455 460

Glu Val Cys Ile Cys Asn Asp Gly Ser Thr Asp Asn Thr Leu Glu Val  
465 470 475 480

Ile Asn Lys Leu Tyr Gly Asn Asn Pro Arg Val Arg Ile Met Ser Lys  
485 490 495

Pro Asn Gly Gly Ile Ala Ser Ala Ser Asn Ala Ala Val Ser Phe Ala  
500 505 510

Lys Gly Tyr Tyr Ile Gly Gln Leu Asp Ser Asp Asp Tyr Leu Glu Pro  
515 520 525

Asp Ala Val Glu Leu Cys Leu Lys Glu Phe Leu Lys Asp Lys Thr Leu  
530 535 540

Ala Cys Val Tyr Thr Thr Asn Arg Asn Val Asn Pro Asp Gly Ser Leu  
545 550 555 560

Ile Ala Asn Gly Tyr Asn Trp Pro Glu Phe Ser Arg Glu Lys Leu Thr  
565 570 575

Thr Ala Met Ile Ala His His Phe Arg Met Phe Thr Ile Arg Ala Trp  
580 585 590

His Leu Thr Asp Gly Phe Asn Glu Asn Ile Glu Asn Ala Val Asp Tyr  
595 600 605

Asp Met Phe Leu Lys Leu Ser Glu Val Gly Lys Phe Lys His Leu Asn  
610 615 620

Lys Ile Cys Tyr Asn Arg Val Leu His Gly Asp Asn Thr Ser Ile Lys  
625 630 635 640

Lys Leu Gly Ile Gln Lys Lys Asn His Phe Val Val Val Asn Gln Ser  
645 650 655

Leu Asn Arg Gln Gly Ile Asn Tyr Tyr Asn Tyr Asp Lys Phe Asp Asp  
660 665 670

Leu Asp Glu Ser Arg Lys Tyr Ile Phe Asn Lys Thr Ala Glu Tyr Gln  
675 680 685

Glu Glu Met Asp Ile Leu Lys Asp Leu Lys Leu Ile Gln Asn Lys Asp  
690 695 700

Ala  
705